

Historic, archived document

Do not assume content reflects current
scientific knowledge, policies, or practices.

Reserve
1281.9
7983

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY

SEP 10 1964

CURRENT SERIAL RECORDS

3
*THE AGRICULTURAL
ECONOMY OF*

TANGANYIKA



6
Foreign Regional Analysis Division
Economic Research Service
U.S. Department of Agriculture

ERS-Foreign 92

Geography.--Area of 361,800 square miles, larger than Texas and Oklahoma combined. It is approximately 740 miles long and 760 miles wide with a coastline of about 550 miles. It has a tropical semiarid climate. Approximately 19 percent of the total land area is used for agriculture including livestock production. Ninety-five percent of the land used for cash crop production is in the peripheral areas of the country. The greater part of the interior is arid bushland. Approximately two-thirds of the country is uninhabited because of the lack of permanent water supply and of tsetse fly infestation.

Population.--About 9.8 million in 1963 with an overall density of 27 persons per square mile and an annual growth rate of 1.8 percent. The population is not evenly distributed. Except for some 22,000 Europeans and about 120,000 Asians, the population is African.

Income.--Gross domestic product at factor cost was \$600 million in 1962; per capita GDP was approximately \$63.

Agriculture.--The world's leading producer of sisal, with about one-third of the annual production. Cotton, coffee, oilseeds, cashew nuts, tea, pyrethrum, and meat also occupy important roles in the country's trade and economy.

Industry.--Principal primary industries are agriculture, forestry, fishing, and mining.

Exports.--About 81 percent of the country's total export earnings are derived from the sale of agricultural products. The estimated value of total exports in 1963 was \$170 million. The United States is Tanganyika's major customer for coffee, taking over 10,000 tons annually valued at \$6 million, and is Tanganyika's second leading customer on a total export basis. Chief export crops: sisal, cotton, coffee, oilseeds, and cashew nuts.

Imports.--Total imports were \$108 million in 1963. One-fourth of Tanganyika's imports come from Kenya and Uganda under the East African Common Market. Imports from the United States in 1963 were valued at \$6 million, mostly nonagricultural. Chief agricultural imports: cereals and cereal preparations, corn, sugar, dairy products, and beer and wines.

Chief customer and supplier.--United Kingdom.

Principal cities.--Dar es Salaam, 130,000; Tanga, 40,000; Mwanza, 20,000; and Tabora, 16,000.

Political status.--Republic within the British Commonwealth, independent December 9, 1961; formerly a Trust Territory under the United Nations Trusteeship.

President.--Julius Nyerere.

Main agricultural problems.--Greater crop diversification, tsetse-fly infestation, more efficient marketing facilities, improved roads, improvement of quality of export crops and livestock.

Future.--Has significant agricultural potential in expanding its cash crop production.

CONTENTS

	<u>Page</u>
Glossary.	iv
Summary.	v
Introduction.	1
The land	2
Geography	3
Climate	5
Soils	6
The people	7
Education	8
Agricultural research and extension services.	8
Land use and land tenure	9
Land use	9
Land ownership and tenure	10
Agricultural production practices	12
Cropping practices.	12
Crop fertilization.	13
Farm machinery and equipment	14
Control of plant diseases and pests.	14
Seed improvement	15
Irrigation.	15
Crop production	17
Cash crops.	18
Food crops.	32
Livestock production.	35
Livestock products.	39
Livestock diseases	40
Food consumption.	40
Agricultural marketing and transportation practices.	42
Agricultural policies and goals	45
International trade in agricultural products.	45
Agricultural exports.	46
Agricultural imports	48
Agricultural trade with the United States	48
Agricultural trade policy.	50
Agricultural development.	51
Outlook.	53
Appendix, statistical tables.	56
Selected references.	58

Washington, D. C.

September 1964

GLOSSARY

AFRICAN - The indigenous population of Tanganyika. Does not include Indians, Pakistanis, white Europeans, or Arabs.

ALIENATED LAND - Land used by non-Africans.

BALE - Unit of measurement for cotton. Net weight of the Tanganyikan bale is 400 pounds.

CD&W - Colonial Development and Welfare. Under a series of Colonial Development and Welfare Acts, the United Kingdom has provided funds to finance projects of development in or on behalf of Tanganyika and other British overseas territories. The bulk of these funds has been disbursed in the form of grants.

CURRENCY - 1 East African shilling = 14 U. S. cents
Shs. 20 = £ 1 = \$2.80
£ 1 million = \$2.8 million
\$1 million = £ 357,000 (approximately)

EAST AFRICA (N) - Tanganyika, Zanzibar, Kenya, and Uganda.

EXPATRIATE - A person who is not a permanent resident of Tanganyika.

GROSS DOMESTIC PRODUCT - Measurement of the value of the domestic gross production taking place in the country. No allowance in the measurement is made for balance-of-payment transactions.

IBRD - International Bank for Reconstruction and Development.

INVISIBLES - External transactions other than trade in commodities and movements of capital; e.g. payment for services, tourism, etc.

LOCAL GOVERNMENT AUTHORITIES - These have been known in the past as Native Authorities.

MIOMBO - Open-canopy type of woodland characteristic of the drier areas of 1,000 to 4,000 feet elevation.

NATIVE AUTHORITIES - Local authorities, particularly in rural areas, developed from the traditional tribal or subtribal authority.

PADDY RICE - Rice in the husk.

ROYAL COMMISSION (EAST AFRICA) - A commission appointed by Royal Warrant in the United Kingdom in 1953 "... to examine the measures necessary to be taken to achieve an improved standard of living ..." in the East African countries of Tanganyika, Zanzibar, Kenya, and Uganda.

SWAHILI - The official language of East Africa. It is the habitual language of many Africans along the coast, but is a second language, taught in primary schools, in the inland areas.

TAC - Tanganyika Agricultural Corporation.

... Most of this manuscript was prepared prior to the formation of the United Republic of Tanganyika and Zanzibar on April 27, 1964. Research and information in this report is confined primarily to the agricultural economy of Tanganyika.

... The "ton" used in this study means the metric ton of 2,204.6 pounds.

... Most photographs used in this study are furnished through the courtesy of the Tanganyika Information Services.

SUMMARY

Agriculture is vital to Tanganyika's economy and development. Over 90 percent of its 9.8 million population is engaged in farming (including livestock raising). The agricultural sector of the economy accounts for over 70 percent of the gross domestic product of the country. About 81 percent of the country's total export earnings are from agricultural products. Ninety percent of the land under cultivation is devoted to the production of grains and other food crops for local consumption, mainly on a subsistence basis. Tanganyika's natural resources are limited and capital is needed to meet its development requirements.

The economy of Tanganyika has developed primarily through the expansion of cash crops for export. Exports take about a quarter of all the goods and services produced and generate about 40 percent of money income in the country. However, as long as the country's economic development is dependent upon imports of manufactured and industrial goods, Tanganyika will have to continue to seek and increase export markets for its cash crops in order to earn needed foreign exchange.

Sisal, cotton, and coffee dominate the country's trade and economy. They accounted for about 55 percent of the value of all exports in 1962. Sisal, primarily a European plantation crop, supplies over one-fourth of total exports by value. The United Kingdom is Tanganyika's major customer; it took 34 percent of Tanganyika's exports in 1962. West Germany is second and the United States is third, each taking about 8 percent of the country's exports in 1962. The United States is Tanganyika's major customer for coffee, taking over 10,000 tons annually valued at \$6 million.

The United States is also an important customer for sisal, tea, hides and skins, and wattle bark extract. U.S. agricultural imports from Tanganyika have risen steadily in recent years and will likely increase substantially in the next decade.

Tanganyika's agricultural export earnings were valued at \$135 million in 1960, \$115 million in 1961, and \$122 million in 1962. They are expected to reach \$185 million by 1965 and \$235 million by 1970. Tanganyika's agricultural exports have been increasing at an average annual rate of 6 percent over the past 10 years.

Tanganyika has an estimated per capita gross domestic product of \$63 and an average annual import trade of about \$115 million. With significant foreign assistance in grants and loans, increased foreign capital investments, and steady economic growth within the country, prospects seem favorable for an expansion of U.S. agricultural and nonagricultural exports to Tanganyika.

Tanganyika's Three-Year Development Plan, instituted in 1961, calls for Government expenditures of about \$67 million over a 3-year period. Financing will come largely from external sources. The plan emphasizes development of agriculture and livestock, improvement of the road system, expansion and improvement of secondary and technical education, and land settlement and self-help projects.

On May 12, 1964, President Julius Nyerere announced a 5-year development plan for Tanganyika, calling for an expenditure of \$688.8 million. This plan is the first of three, which will cover the period 1965 to 1980.



U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 1938-63(5) ECONOMIC RESEARCH SERVICE

Figure 1

THE AGRICULTURAL ECONOMY OF TANGANYIKA

By Carey B. ²Singleton Jr.

International Agricultural Economist

Foreign Regional Analysis Division

Economic Research Service

INTRODUCTION

Tanganyika, an independent country and republic within the British Commonwealth, has a largely undeveloped economy based primarily on agriculture. To understand Tanganyika's present position it is necessary to review its past.

Agricultural development was slow in coming to Tanganyika. Tanganyika's historical background is one of foreign contacts that date back to the ancient Greek mariners. After the Greeks came the Arab and Persian trading caravans, and even to this day, a sizable Arab community exists in Dar es Salaam, Tanganyika. Ivory was one of the main exports of the country. Arab traders traveled into the hinterland of the country, founding trading posts and settlements along the main trade routes. But they did not attempt to develop the interior of the country. The Arabs and Persians were followed many centuries later by the Portuguese, who established trading posts along the shores of the Indian Ocean and conducted trade with the outside world, but did not penetrate beyond the coastal fringe.

Tanganyika's economic development began in 1884 when Karl Peters established a claim for German colonization. During the German colonization period, economic development was based on a plantation economy. The Germans built railways and encouraged settlement along these major arteries of transportation. They developed to some extent an agricultural research and development program and compiled valuable data on the land use, soils, geology, and hydrology of the country. During the 30 years preceding the outbreak of World War I, the Germans introduced sisal, coffee, tea, cotton, and rubber, and experimented with many other cash crops. These crops were grown on small acreages of alienated land; no special effort was made to induce the Africans to produce cash crops. The Germans established some mining projects.

Development progress was interrupted with the outbreak of World War I. An extended and fierce campaign, involving over 300,000 African troops was conducted against the Germans in Tanganyika. This conflict did not end until 1919. After World War I, a League of Nations mandate was given to the United Kingdom to administer the country.

Under the United Kingdom's direction, economic progress was steady up to the outbreak of World War II, but little new capital was invested. The sisal industry continued to develop; the non-African farming community expanded; commerce and banking extended into new places; and gold and diamond mining advanced at an increasing rate. Railways were extended and a few good roads were built. Production of crops increased and greater attention was paid to soil conservation and improved land use techniques. Nevertheless, the pace of economic, political, and social development of the country was slow.

The impact of World War II brought about urgent demand for Tanganyika's commercial crops such as sisal, cotton, and coffee, as well as for foodstuffs. Thus, the tempo of economic life in Tanganyika was accelerated.

In 1946, Tanganyika became one of the first territories to be placed under United Nations trusteeship.

On December 9, 1961, Tanganyika became an independent country and a member of the British Commonwealth of Nations. On December 9, 1962, Tanganyika became a republic with Julius Nyerere as its first President.

Tanganyika has the potential for emerging as an important and influential African country. Its future will depend primarily upon the ability of its leaders to develop an economic system which will provide an incentive for its people to increase productivity, and which will attract sufficient outside capital to help it realize its potential.

On April 27, 1964, Tanganyika and Zanzibar were united in a new republic. The new African nation is called the United Republic of Tanganyika and Zanzibar. One of the major political reasons for this union was the concerted effort of the two governments to prevent a Communist takeover of Zanzibar and East Africa. Zanzibar was rapidly becoming a Chinese Communist base off the East African coast.

The implications of this merger present an enigma to Africa and the world. The immediate impact of the merger is difficult to ascertain. But one effect will be an easing of the financial strain on Zanzibar, whose economy has steadily deteriorated since the revolution in January 1964.

Other effects of the merger might mean:

1. The broadening of international trade by the addition of Zanzibar's clove industry.
2. The strengthening of Zanzibar's economic base, with technical advice and trade promotion from Tanganyika.
3. The establishment, in effect, of a buffer zone to prevent further Communist infiltration in East Africa.
4. A greater movement of labor to and from the mainland.
5. The neutralization of Chinese Communist influence in Zanzibar.
6. An increased rate of growth of Zanzibar's economy.

The union could be a portent of an eventual Federation of East Africa, embracing Tanganyika, Zanzibar, Kenya, and Uganda.

THE LAND

Tanganyika is strategically located about midway down Africa's east coast, and its long coastline has suitable sites for excellent port facilities. However, its rugged topography and tropical semiarid climate have inhibited socioeconomic development in the past, and will continue to present obstacles to development in the future.

In its people, Tanganyika has a resource as yet only partially developed. Disease, malnutrition, and lack of education have to be overcome before the population can realize its potential. The country is struggling to create a healthful environment, an ample food supply, improved educational facilities, and the various other material and cultural aspects of developed economies.

Geography

Located just south of the Equator between the Indian Ocean and the great lakes of Central Africa, Tanganyika has an area of 361,800 square miles. It is larger than Texas and Oklahoma combined. It is approximately 740 miles long and 760 miles wide with a coastline of about 550 miles in length. Tanganyika borders on Kenya to the north and Mozambique to the south. It shares Lake Victoria with Uganda and Kenya, and skirts Rwanda and Burundi to meet the Republic of the Congo (Leopoldville), Northern Rhodesia, and Nyasaland at Lake Tanganyika. In area, Tanganyika makes up approximately 4 percent of Africa.

Physiographically, Tanganyika is a land of great diversity, although its dominant geographic feature is flat to gently undulating plains and plateaus. These rolling plains lie at altitudes ranging from a few hundred feet in the coastal zone to more than 6,000 feet on the Serengeti Plain, the Southern Highlands, and the Ufipa.

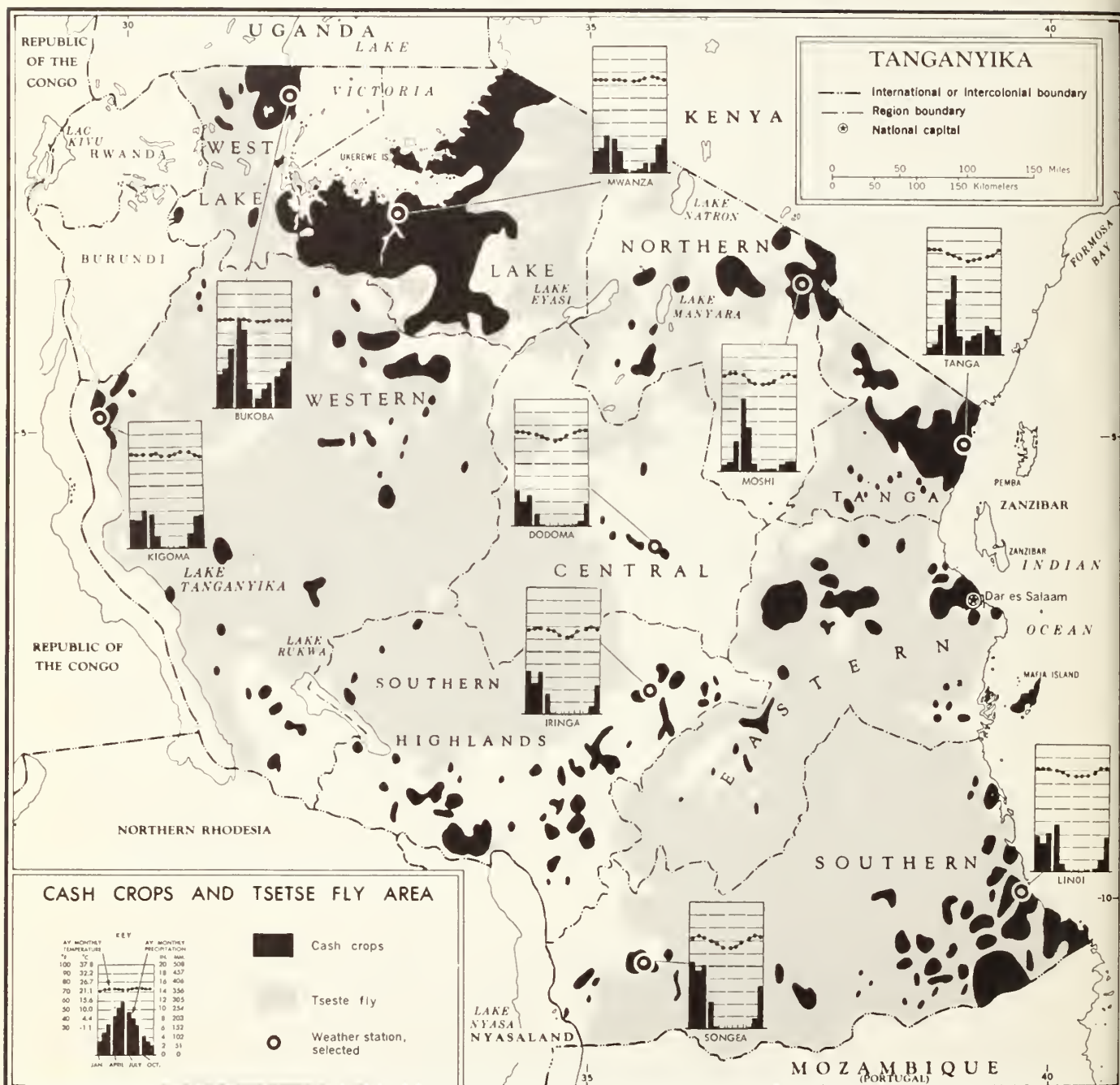
There are widely scattered hills and minor mountain ranges throughout the country. Imposing mountain masses, such as the Usambara in the northeast and the Portoro in the southwest, are of major geographic importance (fig. 1). In Tanganyika, there are two extremes of Africa's topographical relief -- the massive snow-capped Mount Kilimanjaro at 19,340 feet above sea level and the deep trough-like depression of Lake Tanganyika, the world's second deepest lake. The deepest is Lake Baikal in Siberia.

For the most part, the altitude of the great central plateau of the country is approximately 4,000 feet. The plateau is sharply defined along both its eastern and western margins by a series of steep-sided and deeply-eroded escarpments. Along the edges of both these escarpments, the plateau is elevated to form long but relatively narrow and disconnected belts, rising in places to altitudes of more than 7,000 feet.

The Great Rift Valley (fig. 1) extends from near the mouth of the Zambezi through Tanganyika, Kenya, Ethiopia, and the Red Sea to Palestine. It is one of the more remarkable geographical phenomena of the world. Just north of Lake Nyasa, the Rift Valley forks, forming the Eastern and Western Rifts. Between the Eastern and Western Rifts lies the Central Plateau, an immense peneplain with an average altitude ranging from 3,000 to 5,000 feet. Much of the Central Plateau is covered with bush and thicket and large areas are infested by the tsetse fly (fig. 2), making the plateau unusable for agriculture except where measures to eliminate or control the fly have been taken.

The monotony of the landscape is broken toward Lake Victoria by land long since reclaimed from the bush by the Sukuma tribe, an area known as the "Cultivation Steppe". Also, there are widespread swamps toward the boundary of Rwanda, Burundi, and the Congo. South of these swamps, in the area between the Central Railway and Lake Rukwa, lies the "empty quarter" of Tanganyika, some 30,000 square miles of bush, semiarid and tsetse-fly-infested, but with great mineral potentialities. There are no true deserts in Tanganyika.

Major lakes in Tanganyika include Lake Victoria, about the size of Scotland and 3,717 feet above sea level, and Lake Tanganyika, 420 miles long, 30 miles wide and 2,534 feet above sea level; it has recorded depths of more than 4,700 feet. Also, there is Lake Nyasa, about 310 miles long and 30 miles wide; it lies 1,568 feet above sea level.



U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 1939-63(5) ECONOMIC RESEARCH SERVICE

Figure 2

On the map, the country appears to have plentiful water supplies; but it has few permanent rivers of any size. During the rains, there are rivers everywhere--often large enough to present serious problems to railway and road engineers--but at or before the end of the dry season most of the rivers have dried up. The only navigable rivers are the Rufiji, navigable for about 60 miles by small vessels, and the Kagera, navigable for about 90 miles. Tributaries of the Congo, the Nile, and the Zambezi rise in Tanganyika and flow into the Atlantic, the Mediterranean, and the Indian Ocean, respectively. The watersheds of these three river systems never meet at any one point. They are separated by a large depression in the Central Plateau, which has no outlet to the sea.

Climate

Although Tanganyika extends from 1° north latitude to 11° south of the equator, the cooling influence of altitude mitigates its tropical semiarid climate. Temperatures vary from region to region but are sufficiently high most of the year for the production of both tropical and temperate crops.

Tanganyika has three distinct climatological belts. First is the northern coastal belt, a strip of land approximately 100 miles wide, which extends northward from Dar es Salaam to the Kenya border. This belt has a hot humid season with temperatures above 90° F. from December to March and a cool season from June to mid-September. More than half the annual rainfall normally falls in March, April, and May (fig. 2). The second rainy season occurs between October and December. Convectional showers occur during the other months of the year. Rainfall increases from south to north, averaging 40 inches a year in Dar es Salaam and 74 inches at Amani.

Second is the Lake Region, which is approximately 50 miles in width and extends along the shores of Lake Victoria. It has relatively little temperature variation. Rainfall is fairly well distributed throughout the year, although there is greater concentration during March, April, and May. Because of the predominant east-to-west winds, the eastern part of the Lake Region receives 30 to 40 inches of rain annually; the western part, 75 to 80 inches. It is one of the rainiest areas in East Africa.

The third region is made up of the Coastal Belt and the Interior Plateau and extends over the greater part of the country. It is hot and dry. The temperatures in this region are greatly affected by altitude; they range downward to below freezing toward the top of Mount Kilimanjaro. Such rainfall as occurs over most of this region falls primarily between December and April. Over much of Tanganyika, rainfall is unreliable because it varies in amount, intensity, and distribution.

Temperatures are surprisingly uniform over the country. Approximately 75 percent of the country has a mean annual temperature variation of from 69° to 81° F. (fig. 2). The absolute minimum range is 46° to 66° F. These temperatures are favorable for agriculture.

Generally, Tanganyika is dry, although it is subject to two monsoons. These monsoonal currents usually flow over vast expanses of the Indian Ocean and bring moisture-laden air inland from the sea. The failure of these currents to deposit water in any appreciable quantity appears to be due to their being consistently divergent over relatively large flatland areas. But, unlike the monsoons of southeastern Asia, these currents do not deposit water in any appreciable quantity.

In western Tanganyika, rainfall is largely from another convergence zone which arises from the inflow of the westerlies. These winds have their origin in the South Atlantic and retain some maritime character after passing over the Congo. As a result, the convergence of the westerlies with the monsoon air current which has traversed eastern Tanganyika produces considerable additional rain in the western part of the country. During most of the year, this second convergence zone lies somewhat to the west of the 30th meridian. But from time to time, it advances into Tanganyika.

Most of the rainfall over Tanganyika and East Africa varies in both intensity and volume. It is often inadequate for agricultural purposes.

Variable rainfall exerts a profound influence on the way of life of the people and on the distribution of the population. Most of the population in Tanganyika is in the peripheral higher rainfall areas where many different crops are grown. Much of the rainfall occurs at the change of seasons and comes in heavy downpours. Rainfall is badly distributed for the practice of good agriculture. Without irrigation, it would be difficult to develop an economically sound agricultural program.

Soils

In general, the soils of Tanganyika form a patchwork of different types, which vary in development according to climate, topography, parent material, vegetation, and effects of weathering over time.

The soils are essentially thin and infertile and only moderately suited to agricultural use. Limitations in soil use and in productivity are caused not only by the unfavorable characteristics of the soils themselves but also by inadequate and inconsistent rainfall over a large part of the country.

Soil types range from Latosols, the most extensive of the best agricultural soils, to Bog or Half Bog soils, which are commonly waterlogged and restricted in agricultural use.

Latosols occur on plains and hills of northwestern and southern Tanganyika. Generally, Latosols are well drained, friable, and red. They have sandy loam to silty clay loam surface layers over predominately clay subsoils. They are rapidly permeable to water and can be worked a few hours after rain. Latosols contain only moderate to low amounts of available plant nutrients and are particularly low in available phosphorus. The present vegetative cover consists mainly of scattered areas of brush and grassland. Under proper management, Latosols can produce a variety of cultivated crops and forage for livestock.

Grumusols, which also have a relatively high agricultural potential, are located primarily in Tanga and the Northern and Central Regions; they range from dark grayish-brown to black poorly drained soils. Most Grumusols consist of clay loam and silty clay, but areas with silt loam or fine sandy loam surface layers are common. In some places, particularly in the Pangani River Valley, these soils are too salty for most plant growth. In most of these areas the land will not support a grass cover to provide grazing. In better drained areas of coarser textured soils and where drainage and irrigation are feasible, these soils could produce good yields of adapted cultivated crops, including cotton and rice.

Tropical Brown Forest soils are found primarily in the Lake Region in a broad band paralleling the eastern and southeastern shores of Lake Victoria, in the Rukwa Trough containing

Lake Rukwa, and in the valleys of three rivers--Great Ruaha, Kilombero, and Rufiji. Here, Tropical Brown Forest soils occupy the high-lying and better drained areas. At present, an association of Grumusols and Tropical Brown Forest soils supports a large percentage of African-grown food and forage crops.

Ando soils are coarse-to-medium textured, of volcanic origin, and have only fair potential for agricultural use. These soils are located primarily in the Arusha and Njombe areas.

Brown soils occur mainly in northeastern Tanganyika on deposits of volcanic ash. These soils are predominantly coarse-to-medium textured and have surface layers low in organic matter. The present cover is poor grassland with scattered areas of brushland.

Noncalcic Brown soils are the most extensive soils in Tanganyika. They occupy much of the plains and plateaus of the northern two-thirds of the country. These soils support a poor grassland type of vegetation and are interspersed in some areas with barren ground, although brush is the dominant cover. Agricultural use of these soils depends largely upon availability of water for irrigation.

Lithosols occur on the steep slopes of hills and mountains and are either shallow or rocky. They are of little or no agricultural value except for marginal grazing land.

Bog or Half Bog soils occur extensively on the plain along the Wami and Mpwapwa rivers in the Eastern Region and on the outer edge of the delta of the Rufiji on the east coast. These soils are commonly waterlogged; this restricts their agricultural use. Areas of alluvial soils are associated with these perennially wet soils, particularly along the Kagera in northwestern Tanganyika, along the lower reaches of the Rufiji, and on the plain west of Morogoro. These soils are fertile, well-to-poorly drained, and suited to a variety of crops such as rice and cotton, although many areas would require artificial drainage.

THE PEOPLE

Tanganyika's unevenly distributed population in 1963 was estimated at about 9.8 million, giving an overall density of 27 persons per square mile.

Except for some 22,000 Europeans and about 120,000 persons of other nationalities (mainly Asian), the population is African. The Africans are descended from many intermingled racial stocks. The Nilotic and Hamitic tribes came from the north and the Zulus from the south. At present, there are 120 different tribes, of which the largest, the Sukuma, accounts for about 12 percent of the total African population. Most of the people are Bantu-speaking; however, there are considerable variations within this linguistic group. Swahili is the most widely understood language and is generally used in commercial transactions and for communication between different tribes.

Africans work on European estates in Tanganyika as hired farm laborers. African women are often employed on the large estates to harvest coffee and to pick over the coffee berries. The main reservoirs of labor are the Central, Lake, Southern Highlands, Southern, and Western Regions. The Eastern, Northern, and Tanga Regions are generally deficient in labor. The Lake Region provides labor for the local mining industries. Only about 400,000 Africans work in agricultural and nonagricultural industries.

Trade, together with some small-scale manufacturing, is largely in the hands of the Indians, Pakistanis, and Arabs. The Europeans are mainly administrators and technicians; a small number own or manage agricultural estates or are engaged in commerce and industry. The size of the European population depends for the most part on net immigration.

Tanganyika has an adequate supply of unskilled labor and a shortage of semiskilled and skilled workers. Unemployment exists only in the largest urban centers.

There is considerable movement of Africans within the country and between neighboring countries, since a high percentage of the African unskilled labor force is migratory. The exact number is not known, however, as short-distance movements of Africans between countries are not covered by migration statistics.

EDUCATION

Emphasis is being placed on education, particularly primary and secondary school levels, extension work, and better utilization and application of research findings in agriculture and livestock farming. Makerere College, in Kampala, Uganda, has an agriculture and veterinary school which serves East Africa. There are three schools for training agricultural field assistants and extension agents at about high school level at Ukiriguru, Tengeru, and Morogoro.

The literacy rate in Tanganyika is very low, but the number of children who receive some education has increased considerably in recent years. In 1947, only 124,000 children attended primary and secondary schools. By 1960, the number had risen to 450,000. Most of the children, however, do not attend school beyond the fourth grade. The current Three-Year Development Plan is giving priority to expanding secondary and technical (including agricultural) education for Africans, including girls.

In 1960, Tanganyika had 171 students at Makerere College (social science), and 30 students at the Royal College in Nairobi (engineering). At present, a group of Tanganyikans is receiving agricultural training in the United States at the University of West Virginia under a contract with the U.S. Agency for International Development.

Agricultural Research and Extension Services

Although research facilities and personnel are limited, some beneficial agricultural research has been carried on in Tanganyika, particularly on important export crops. Work in many other fields has been limited or neglected, among them local food crops, general agronomic problems on African farming and land use, soils and their management, control of animal parasites, and some animal diseases. Nevertheless, the research stations and the Tanganyika Agricultural Corporation (TAC) have accumulated knowledge and experience that should help to expand and intensify further research.

The Ministry of Agriculture is responsible for the direction and coordination of most agricultural research, even that of commodity research stations financed wholly or partly by growers and other organizations. As of 1963, research on crops, including pastures, was headed by the Department of Agriculture's Research Division; that on livestock, by the Department of Veterinary Services; and that on irrigation, by the Department of Water Development and Irrigation. These three agencies carry out experimental work on the farms of TAC, whose research activities have been transferred to the Ministry of Agriculture.

The Empire Cotton Growing Corporation, in cooperation with the Government, continues to play a major role in research, production techniques, and improvement of cotton.

Research of the Department of Veterinary Services is closely tied in with that of the East African Veterinary Research Organization.

Regional and district agricultural officers of the Ministry of Agriculture provide extension services. Until recently, Africans were employed only as assistants, but some now have higher posts as a result of special training in the United States through the Agency for International Development.

While the number of extension workers has increased greatly during the past decade, it is still small in relation to the number of African families. Also, extension workers are often handicapped by deficiencies in education and training and the time taken by many other types of work they must perform. Effective extension work has also been limited by the extreme conservatism of indigenous African farmers and, until recently, by the lack of legislation for promotion of good husbandry. Except in a few areas, such legislation could not be enforced because of the mass opposition of the people, and most regulations had not been accepted by the end of 1960.

A 3-year development program has been instigated and includes a limited plan for community development and a large increase in funds for extension services. A Ministry for Cooperative and Community Development was established early in 1962, reflecting an increasing interest by the Government in community development.

LAND USE AND LAND TENURE

Land Use

Marked variations in Tanganyika's physical resources, varying customs of its more than 120 tribes, and tsetse-fly infestation have resulted in a heterogeneous land-use pattern.

It is estimated that about 41 million acres, 19 percent of the total land area, was used for agriculture in 1963 (table 1). Less than half of this area, however, was used for annual and perennial crops, tree crops, temporary meadows, and fallow in rotation.

The remaining 81 percent of the land area was not used for agriculture, except perhaps for some nomadic grazing of cattle on wooded grassland. This nonagricultural area included roughly 38 million acres, or 17 percent of the total land area, reserved by the Government for forests and game reserves. Much of the land not used for agriculture is infested with tsetse fly. Even if this pest were controlled, the low and poorly distributed rainfall and thin soils would limit use of most land to livestock production. The absence of roads and communications networks, the presence of wild animals, and the prevalence of malaria and other diseases also discourage utilization of land not now in agriculture.

Approximately 1 percent (2.2 million acres) of the total land area is used for non-African agriculture and large-scale commercial farming. Included are towns and trading centers and land under TAC control. Virtually all--95 percent--of the land used for cash crops and the population centers is within the peripheral areas of the country. Land used for pasture, mainly rough grazing, lies chiefly within the Western, Central, and Lake Regions.

Table 1.--Land use in Tanganyika, 1963

Use	Area	Percentage of total
	<u>Million acres</u>	<u>Percent</u>
Agricultural land		
Cropland ^{1/}	19.0	8.7
Permanent unwooded grassland	<u>21.7</u>	<u>9.9</u>
Total agricultural land.....	40.7	18.6
Nonagricultural land		
Forest reserves	21.4	9.8
Game reserves	16.6	7.6
Other land	<u>139.6</u>	<u>64.0</u>
Total nonagricultural land	177.6	81.4
Total land area	218.3	100.0

^{1/} Includes land in field and tree crops, temporary meadows, and fallow.

Indigenous Africans generally practice subsistence farming under shifting cultivation on land held as tribal communal property. Under this system an individual or family clears an area of regenerated bush by cutting, burning, or both, cultivates it for 2 to 8 years--depending on its fertility and the availability of other land--and then the cultivator repeats the process elsewhere, leaving the formerly used land to recuperate under bush fallow for a prolonged period, usually for 10 years and often much longer. Without the addition of fertilizer or manure, soil fertility inevitably declines through erosion. Natural vegetation has seldom been replaced under fallow. This shifting cultivation, combined with uncontrolled fires for clearing, has reduced huge woodland areas to mediocre scrub on soils of reduced fertility.

Despite its deficiencies, shifting cultivation has provided food for a sparse population having only primitive tools--the hoe and the machete. However, with the introduction of cash crops, expansion of livestock herds, and increased population pressure on arable land, bush fallowing is being practiced for shorter periods or eliminated altogether. Few African farmers have adopted any substitute means for maintaining soil fertility.

In 1961, an International Bank for Reconstruction and Development (IBRD) mission summarized land-use problems and the need for improved agricultural practices in Tanganyika as follows: (1) Only by complete changes in methods and organization can the country transform traditional cropping and stockraising methods, which not only give low yields but damage soil and water resources. (2) Although overall population density in Tanganyika is low, land of good productive potential is not so plentiful that the country can afford the present soil and water losses. (3) In certain areas, the dense population presses so heavily on the available arable land that resettlement is desirable. (4) To obtain adequate return from the high costs of settling empty areas, settlers must adopt improved agricultural methods.

Land Ownership and Tenure

By and large, African land has been held on a communal basis, with tribal or clan authorities acting as trustees for distribution of land for crops and grazing. Although tribal practices

vary, most land is parceled out on two general systems, family and communal. Under the family system, the allocated plot is held permanently by the cultivator; under the communal system, allocation is renewed periodically.

Under both systems, each tribal member has an inalienable right to a piece of land according to his needs so long as he exercises his right and obeys tribal rules. Also under both systems, the cultivator has full use of the land and owns all he produces, but he cannot mortgage or sell the land or leave it to his children. When one plot shows signs of soil fertility exhaustion or the cultivator deems it unlucky, he seeks allocation of another. Neither the tribesmen nor the tribal authorities consider the land as valuable in itself but solely as a means of producing food. Soil conservation techniques are applied only when the supply of new or bush fallow land becomes scarce, and then only on a limited scale.

Customs in a few African areas have allowed restricted individual ownership. For example, the Chagga's banana-bean-coffee gardens (Vihamba) are individually owned, but land used for annual crops is communally owned. Some tribes, like the Wabena, have held that bush clearing makes the land a man's or family's own property. Usually, however, holders of these properties cannot transfer their rights to anyone outside the tribe.

Farm holdings of Africans vary greatly in size, according to land use. A controlling factor in size is the amount of land a family can cultivate with hand tools. Large areas of the Central and Western Regions and arid parts of the Northern Region are occupied by tribes like the Masai, who practice pastoralism with limited crop production.

Non-African agriculture is based mainly on leaseholds. This tenure pattern has developed in the limited areas farmed by non-Africans in Tanga, the Northern Region, and to a lesser extent the Southern Highlands Region. Estates in these regions are used primarily for cash crops and have been handed down from generation to generation under 99-year leaseholds. However, some freehold land was distributed in the German era. The Tanganyikan Government has not opposed this area being under leasehold, because the security of tenure has been conducive to improved soil management and land use.

Although the tribal concept has remained, changes in land tenure have occurred because of increasing pressure of population on arable land, introduction over the past 30 years of cash crops (coffee, cotton, sisal, and coconuts), intrusions of alien land-use systems, and erection of permanent dwellings. Some tribal authorities have approved--and others opposed--development of individual family tenure and ownership. In some areas, especially densely populated or permanent crop areas, authorities have attempted to adjust native law and custom, or the customs have gradually eroded. Tenure status has become clouded, leading to much litigation.

Obstacles to optimum land use under traditional African tenure may be summarized as follows:

1. Users have less interest in the care of allocated land than they would have in land held under a 99-year leasehold or a freehold.
2. Intensive types of planned farming are difficult to introduce.
3. Land-use planning on an area basis is extremely difficult.
4. Practically no means are available for preventing unproductive or destructive land use.

5. Large-scale movement of people from overcrowded to uncrowded areas is impracticable.
6. Land cannot be used as security for improvement loans.

In March 1963, fundamental land-reform legislation was enacted in Tanganyika. Known as the Rights of Occupancy (Development Conditions) Bill, the legislation provided for the conversion of freehold land to leaseholds. It set nominal rents for leaseholds and fixed residence, cultivation, and development requirements for leaseholders.

In pastoral areas, communal land use and ownership will probably continue for some years. Here, individual African tenure, even on leasehold, is not immediately practicable because of the expense of providing water for seasonal grazing.

A sound range-management program should be instigated, and accepted by the people, in the freeing of new extensive grazing lands of tsetse-fly infestation. Without control of livestock numbers and diseases, the land is likely to be overgrazed, denuded, and eroded, and the cattle are likely to deteriorate further in quality.

Questions of land tenure are extremely delicate, and the Government has to move carefully. Africans have become so sensitive to Government intervention that they have even actively opposed alienation of land for forest and game reserves.

Nevertheless, the Government is apparently determined to reduce tribal control of land and bring about better land use. Progress can be expected as the people are educated, trained, and shown the benefit to be derived from leasehold tenure. Land reform and development also involve complex economic problems which can be solved only by careful planning and execution.

AGRICULTURAL PRODUCTION PRACTICES

Cropping Practices

The most primitive method of cultivation, after the land is cleared by cutting, burning, or both, is merely to scratch the surface and plant the seed. Cultivation improvements have long since been made in some areas. The Hehe tribe, for example, constructs large ridges for their crops by burying considerable quantities of vegetable matter. Sweetpotatoes are planted the first year and grain and other crops are grown for several years in succession. Tie-ridging, apparently an adaptation of the traditional Hehe ridging system, is used to some extent. It has been quite successful, especially where cotton and peanuts are grown. Small ridges are made with hoes or ox-drawn plows to form basins which impound and thereby conserve the limited rainfall. None of the ridging systems has been able to maintain soil fertility. However, ridging has helped in some degree to prevent soil erosion.

With the introduction of cash crops and increases in the human and livestock population, the traditional system of shifting cultivation has been greatly altered by reducing the period of fallow. For example, in the Eastern Usambara section of Tanga Region, a rotation of 1 year of corn, 2 of cassava, and 3 of fallow is currently popular. In the coastal section of Tanga Region, where food crops are often interplanted with tree crops, the usual system is also 3 years of crops followed by 3 years of fallow. In the more densely settled sections of the country, the period of fallow has been practically eliminated.

Tools for crop cultivation include hoes, plows, some bush cutters, planters, cultivators, weeders, and processing equipment, largely owned by Europeans. Knapsack sprayers and coffee-processing equipment play a major role in African coffee production.

In the late 1940's and early 1950's under the Groundnut (Peanut) Scheme, a substantial quantity of large mechanized equipment was imported, partly from war-surplus supplies. Experience with this equipment was unsatisfactory because of poor maintenance, poorly adapted equipment, lack of experience, and high operational costs. Since 1954, much valuable experience has been gained, under more practical operating conditions, on the farms of the Tanganyika Agricultural Corporation (successor to the Groundnut Scheme). The Department of Agriculture has also encouraged contract tractor plowing in some areas by Government and privately owned tractors, but because of inexperienced drivers and poor maintenance, results have not been entirely satisfactory.

There are no facilities in Tanganyika for producing or assembling tractors, sprayers and dusters, moldboard plows, and similar farm equipment. Maintenance facilities for tractors and other equipment are generally poor and scattered.

Crop Fertilization

Use of commercial fertilizer in Tanganyika is still small, although substantial increases have occurred in recent years (table 2). Most of the fertilizer is used on European plantations. In 1960, only 60 tons of commercial fertilizer was used on all African plantings in the Lake Region, where most of Tanganyika's cotton is grown. Use of manure is rare on both African and non-African farms.

Table 2.--Tanganyika: Consumption of chemical fertilizer in terms of plant nutrients, 1953/54 through 1961/62 1/

Year <u>2/</u>	P ₂ O ₅	N	K ₂ O
	1,000 metric tons	1,000 metric tons	1,000 metric tons
1953/54.....	280	280	94
1954/55.....	370	503	154
1955/56.....	<u>3/</u>	<u>3/</u>	180
1956/57.....	<u>3/</u>	<u>3/</u>	<u>3/</u>
1957/58.....	300	<u>3/</u>	<u>3/</u>
1958/59.....	610	556	435
1959/60.....	762	865	456
1960/61.....	810	1,254	470
1961/62.....	<u>3/</u>	1,423	490

1/ All fertilizers used are imported.

2/ Year beginning July 1 and ending June 30.

3/ Not available.

Source: Fertilizers, an annual review of world production, consumption and trade 1962. Food and Agriculture Organization (FAO).

Use of fertilizer is low in Tanganyika because of its high cost and the primitive cultivation methods of indigenous African farmers. However, even efficient producers have not seen fit to maximize use of fertilizers on their crops. Considerable research is being conducted on fertilizer usage, and should lead to increased use by farmers, especially if accompanied by improved seed varieties and improvement in other cultural practices.

No commercial fertilizer is produced in Tanganyika; however, some interest has been shown recently in developing phosphate deposits in the Northern Region for this use.

Intercropping of beans with corn or other grains is commonly practiced. In some areas of good soils and rainfall, two crops a year can be produced on the same land because of the long growing season. In the lower Rufiji Valley, where rice is grown under variable flood irrigation practices, cotton is frequently planted after corn or rice as a second crop if there is sufficient moisture, especially when the rice crop has been a partial failure. Double cropping might be considerably increased with improved land use and cropping practices in some areas, such as parts of the Southern Highlands Region.

Farm Machinery and Equipment

Most African farmers still use the hoe for land preparation and cultivation and the machete for cutting brush and trees. However, a few African farmers, particularly in the cotton areas of the Lake Region, use oxen-drawn plows for land preparation.

A census of large-scale commercial farming in 1960 reported the following numbers of machines in use:

Tractors, wheel.....	1,437	Harrows.....	1,103
Tractors, crawler.....	378	Rippers	194
Combine harvesters ...	132	Locomotive, small	
Spraying and dusting		Diesel type*.....	517
machinery	486	Trolleys*	10,098
Plows	1,168	Motor transport.....	1,463

* Used mainly on sisal estates.

The Northern, Eastern, and Tanga Regions, in that order, had the largest number of tractors, representing 70 percent of the total listed, whereas West Lake, Lake, Central, and Western Regions had the fewest.

Control of Plant Diseases and Pests

Fungicides and insecticides are not used extensively in Tanganyika. Pyrethrum flowers produced in Tanganyika are exported to Kenya for processing. However, a new pyrethrum extract factory, producing pyrethrum for export, is now in operation at Arusha. Imported pesticides are used primarily on European plantations.

Tanganyika is subject to invasion by desert locusts from the north and red locusts from the west; the breeding centers of the locusts are in the northern basin of Lake Rukwa. There have been no serious invasions of the red locust in recent years because of measures taken by international control organizations.

The Tanganyika and Kenya agricultural departments have cooperated for some years in a campaign against the Sudan Dioch, a grain-eating bird that does severe damage. The nesting sites of these birds are in Tanganyika.

The Produce Inspection Service in Dar es Salaam and Tanga enforces rigid inspection and, when necessary, the fumigation of incoming grain shipments and storage facilities to prevent infestations of the Khapra Beetle (Trogoderma granarium).

Control measures have also been taken against rats, pigs, porcupines, and moles. Hippopotamuses and elephants, which sometimes seriously damage local crops, are driven away from cultivated areas by the Game Department.

Seed Improvement

Tanganyika's greatest accomplishment in crop improvement has been the development of new cotton and coffee varieties which are widely used. Cottonseed is furnished free to African farmers each year.

Recently, a promising hybrid variety of sisal was developed at the Sisal Research Station. But it will require 5 to 10 years of testing (now in progress on farms) before conclusive results are available.

The major aim in wheat-seed improvement is rust resistance. The International Wheat Rust Nursery and the Plant Breeding Station in Kenya have been important sources of varieties for study under Tanganyikan conditions. Little progress has been made, however, in selection of rust-resistant varieties, because in years of humid weather and heavy rainfall, new strains of rust develop as fast as varieties of wheat resistant to the earlier types are discovered. In 1960, about 800 varieties of wheat were tested in Kenya of which 119 were considered worth further testing.

Research on cassava varieties resistant to mosaic disease has been carried out for nearly half a century. Improved varieties have been distributed to producers in various areas.

Some seed corn selection work has been done, but little has been done on hybrid corn. A small amount of hybrid seed has been imported by European growers in the Northern Region. Seed-improvement work has also been done on cocoa, cashew nuts, white potatoes, rice, sesame seed, soybeans, other beans, flaxseed, and peanuts. Most subsistence farmers, however, continue to plant seed saved from the previous year's crop.

Tanganyika's only known large-scale production of seed is of seed beans in the Northern Region and, in recent years, some seed peas in the Southern Highlands Region. These seeds are grown primarily for export, under contract, to seed firms in Western Europe.

Irrigation

Only a small part of Tanganyika's cropland is irrigated and much of this land is in European estates. The largest single irrigated area is the sugar estate at Arusha Chini, near Moshi, which has about 7,400 acres of irrigated land. It is chiefly watered by overhead irrigation. The recently established Kilombero Valley Sugar Company also makes use of overhead irrigation on its sugar plantations (fig. 3).



Figure 3.--New sugarcane plantation in the Kilombero valley, a joint Government and private enterprise. Irrigation water is being pumped from the river.

The extent of African irrigation is not known, but a number of small irrigated areas are found on the slopes of Kilimanjaro and Mount Meru, and throughout the country near perennial streams and in valleys. In the Weru Weru catchment area near Moshi, over 400 furrows divert water from the river and its tributaries. There are also many furrows conveying water from streams in the Usambara Mountains. It is estimated that about 24,700 acres are irrigated by Africans in the Tanga Region. Irrigation in the Western Region is made possible by a number of small dams. In addition to sugar, crops grown at least partly under irrigation include coffee, rice, corn, and onions. In 1960, most of the country's 84,000 acres in rice were irrigated. African irrigation methods are generally primitive and result in considerable waste of water, but irrigation techniques are well developed on some of the European estates.

From 1954 to 1959 an FAO team, in cooperation with TAC, the Government of Tanganyika, and the Colonial Development and Welfare Funds (CD&W), made a large-scale survey of the watersheds of three rivers flowing into the Indian Ocean: the Pangani, Kingoni (also called Ruvu), and Rufiji Rivers. The watershed of the Rufiji River is the largest, covering nearly one-fifth of the total area of the country. Results of this survey and other available information indicate that appropriate combinations of irrigation and flood control could add around 3.7 million acres to the country's crop area. Although this area represents less than 2 percent of the total area of the country, it would add about one-fifth to the total cropland.

The Economic Survey Mission of IBRD to Tanganyika, following visits in 1959 and 1960, recommended that a program of irrigation and flood control be undertaken to provide progressively for the addition of 24,700 acres of irrigated land a year by 1969/70. The Mission

recommended the program be started in areas such as the Rufiji River Valley or the Kingoni Basin, where possibilities for large-scale irrigation projects are best. And it also recommended projects in small areas in many parts of the country where there is a special need to improve or diversify the food supply or for relieving overpopulation in relation to land resources, where the risks of soil fertility loss and erosion are high. Several irrigation "trial farms" have been created in the Rufiji Basin in the Southern Highlands Region. The largest one is operated by TAC at Mbarali; the farm is expected eventually to provide supervised irrigation farming of 4,900 acres for indigenous Africans. The purpose of this type of farm is to determine the organizational implications of irrigation on a large scale as well as to determine adaptability of individual crops to local conditions.

CROP PRODUCTION

Tropical and semitropical crops for export play a major role in Tanganyika's agricultural production. In 1962, agricultural and livestock products accounted for approximately 80 percent of all export proceeds. Sisal, cotton, and coffee occupy dominant positions in the country's trade and economy. Tanganyika also produces and exports moderate quantities of oilseeds, cashew nuts, tea, pyrethrum, and wheat. Table 3 shows the production of crops in Tanganyika from 1952 to 1963. (See appendix tables 16 and 17 for a detailed account of production and acreage of principal crops.)

Table 3.--Principal crops of Tanganyika: Estimated production,
average 1952/53-1954/55, annual 1959/60-1963/64 1/

Commodity	Average : : 1952/53- : 1959/60 : 1960/61 : 1961/62 : 1962/63 : 1963/64 <u>2/</u> : 1954/55 : : : : :
	- - - - -1,000 metric tons - - - - -
Cash crops:	
Sisal	176 208 201 220 224 224
Cotton lint	14 37 34 30 38 48
Coffee	17 26 30 25 28 29
Oilseeds	
Cottonseed	29 78 73 64 81 102
Peanuts, unshelled	32 34 36 25 25 25
Castor seed	12 14 12 10 12 12
Sunflower seed	7 5 12 11 8 8
Sesame seed	6 10 10 12 9 8
Copra	17 12 10 9 6 9
Soybean	1 3 3 2 2 2
Cashew nuts, unshelled..	11 50 40 48 50 61
Tea	1 4 5 4 5 5
Food crops:	
Sorghum and millet	468 995 914 975 1,000 1,050
Corn	400 635 559 457 508 520
Beans and peas	154 250 203 250 250 250
Rice, paddy	60 82 95 80 100 120
Sweetpotatoes	243 203 200 225 225 250
Plantains and bananas ...	636 681 686 700 750 775
Cassava	1,100 630 900 1,000 1,050 1,100

1/ Unless otherwise indicated, the bulk of the harvest occurs in the first half of the split year; sorghum and millet, rice, cassava, peanuts, and sesame seed harvest is divided between the two halves of the split-year; castor seed, soybeans, and sunflower seed are harvested mainly in the second half of the split-year. 2/ Estimate.

Food crops for domestic use include grains (chiefly corn, sorghum, and millet), pulses, plantains (cooking bananas), rice, sweetpotatoes, and cassava. Consumption of vegetable oilseeds is considerable.

Present agricultural production policy points toward greater diversification of crops, but at the same time special emphasis is placed on increasing the production and quality of the country's export crops--sisal, cotton, coffee, oilseeds, tea, and cashew nuts. (See figure 2 for cash crop areas.)

Cash Crops

Sisal.--Tanganyika is the world's largest producer of sisal; it produces more than a third of the world's supply. Sisal is by far the most important commercial crop and source of income in Tanganyika. In 1962, it contributed 36 percent of the country's agricultural export proceeds valued at \$44 million (fig. 4). In that year, Tanganyika sold 20,700 tons of sisal valued at \$3.6 million to the United States.

In recent years, exports of sisal have expanded at a rate of about 5 percent per year. Table 4 shows that sisal production ranged from 179,000 tons in 1955 to 224,000 tons in 1963.

The world market for sisal depends on the general business activity, and particularly on the demand for baler twine and marine cordage. If present price relationships among the major hard fibers do not change appreciably, world demand for sisal fiber should continue to expand at a favorable rate of 5 percent per year.

Sisal accounted for more than a third of the agricultural exports and more than a fourth of total exports in 1962. It provides year-round employment for more Africans than any other single industry or crop. For the most part, sisal production is a highly organized European plantation industry developed in the last half century by private foreign initiative and capital. Plantation production is in the hands of less than 200 private or corporate units, all members of the Tanganyika Sisal Growers' Association. A statutory body, the Tanganyika Sisal Board, which includes representatives of Government as well as growers, was established in 1934. The industry has its own labor-recruiting organization, its own inspection system to ensure a high-quality product, and its own marketing organization.

Sisal production is concentrated in the Tanga and Eastern Regions near rail and port facilities, with a few areas around Dar es Salaam. Small but rapidly increasing quantities of lower quality hedge sisal are produced by Africans in the Lake Region; this production, insignificant in 1958, amounted to about 5 percent of the country's total production by 1961.

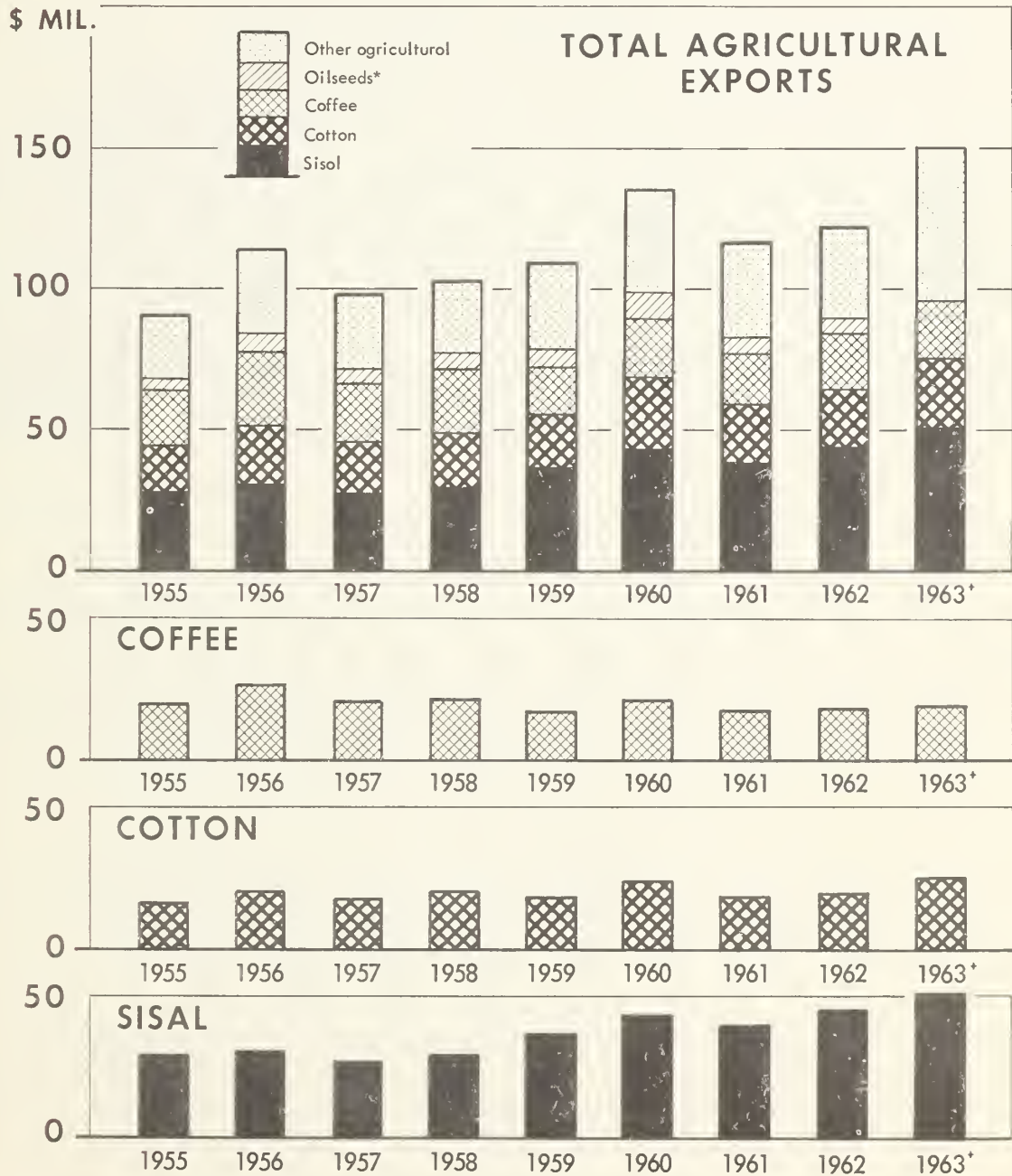
Further increases in sisal production, at least by non-Africans, must come mainly from higher yields, because there is little likelihood of further alienation of land for sisal production.

The major outlet for sisal is for use as baler twine in the United Kingdom, other West European countries, and the United States. But sisal must compete, especially in the American market, with Brazilian sisal and Mexican henequen. In Western Europe, substantial use is made of sisal for marine cordage, rugs, and in some countries for strong twine for industrial packaging.

Propagation of sisal is largely by bulbils (a small or secondary bulb produced in the leaf axils). Tropical legumes are often planted between rows. Plants ordinarily come into production

FIGURE 4

TANGANYIKA: TOTAL AGRICULTURAL EXPORTS AND EXPORTS OF MAJOR CASH CROPS



*Including oil nuts and oil kernels

*Preliminary

Table 4.--Tanganyika: Area, yield, and production of sisal, 1955/56 to 1963/64

Year <u>1/</u>	Area	Average yield per acre	Production
	<u>1,000 acres</u>	<u>Pounds</u>	<u>1,000 metric tons</u>
1955/56.....	385	1,014	179
1956/57.....	395	1,058	189
1957/58.....	393	1,058	188
1958/59.....	415	1,102	209
1959/60.....	445	1,036	208
1960/61.....	445	992	201
1961/62 <u>2/</u>	445	1,080	220
1962/63 <u>2/</u>	445	1,102	224
1963/64 <u>2/</u>	445	1,102	224

1/ The bulk of the harvest occurs in the first half of the split year.

2/ Estimate.

in 4 to 5 years and continue to produce for 3 to 5 years thereafter. If the plant is allowed to blossom, however, it is of little further use for cutting. Old plants are removed mechanically and replaced. The leaves are cut by hand throughout the year and are transported to plantation processing units by tramway or motortruck (fig. 5). Although the plant itself will withstand some drought, dependable water supplies are required for decortication and washing of the fiber. Each plantation has one or more decorticators. When the fiber has been decorticated and washed, it is dried, sorted, graded, and baled on the plantation for shipment (fig. 6).

The Sisal Growers' Association has financed the Ministry of Agriculture's Research Station at Mlingano (near Tanga) since 1934. One of the achievements of this station is the development of a potentially high-yielding sisal hybrid (No. 11648). Other accomplishments include improved machinery, use of fertilizer, weeding, better spacing and cutting methods, and disease control. The sisal weevil has been successfully controlled by insecticides. The Government is also attempting to raise the quality of hedge sisal through better production, processing, and grading methods.

A new supplemental source of income for the industry in Tanganyika and Kenya is a byproduct developed by British scientists from the waste juice of the decortivating process. Betamethasone, a drug used in treating rheumatoid arthritis and glandular diseases, is now produced in quantity from hecogenin, which is extracted from the sisal juice.

Since Tanganyika's independence, export taxes have been levied on sisal. Freight rates have risen and wages for sisal workers have increased between 25 to 40 percent. In the meantime, a United Kingdom company has perfected and is marketing a synthetic baler twine in Europe and the United States. This synthetic fiber will undoubtedly compete with sisal and other baler and binder twines as well as with other cordages.

Competition in other parts of the world is also taking a share of the sisal market. For many years, African countries produced from 60 to 80 percent of the world's supply of sisal.



Figure 5.--Loading sisal leaves onto narrow gauge railway on a Tanganyikan plantation.

Now, countries in the Western Hemisphere, notably Brazil and Haiti, have gained in importance as producers of this fiber. Brazil and Haiti's share of the world total rose from 3 percent in 1935 to 32 percent in 1962.

Cotton.--Cotton is Tanganyika's second leading export crop and a major source of foreign exchange. In 1962, Tanganyika's cotton exports amounted to \$21 million, 17 percent of all its agricultural exports (fig. 4). Practically all the lint cotton produced in the country is marketed overseas. Major markets are Japan, West Germany, and Hong Kong. At present, Tanganyika has no cotton textile mill and no cotton handicraft industry.

Tanganyika's cotton--all of the American upland variety--is of considerable importance to the United States. From 85 to 90 percent of the crop is grown around Mwanza, and in Musoma near Lake Victoria (fig. 1). More than half of the remainder is grown in the Eastern Region. The West Lake Region and the Northern, Tanga, and Western Regions also grow small quantities of cotton.

Production has trebled since the early 1950's. The 1962 crop was 38,000 tons. Both increased yields and expanded acreage have contributed to this rise. Also, farmers are able to sell their cotton at good prices, which are fixed in advance by the Lint and Seed Marketing Board. The rapid growth of marketing cooperatives has given cotton farmers a greater share of the profit. A cotton price stabilization fund established by the Government was built up by withholding from the cotton farmer a part of the value of his cotton in the period of high prices during and after World War II. Money from this fund, which is now administered by the Lint and Seed Marketing Board, has been used to support cotton prices to the farmers in the last few years, to make loans



Figure 6.--Sisal planted in double rows with wide space between. Leaves are cut by hand, bundled, and carried to truck or tramway for transport to mill.

to cooperatives, and to finance the establishment of gins. The fund is also used by the Board to provide its working capital, promote research and extension work in cotton, and for construction of roads and bridges in cotton-growing areas.

Technicians at the Empire Cotton Growing Corporation at Ukiriguru Research Center have also helped to increase production by developing varieties of cotton from which higher yields, pest resistance, and better quality are obtained.

Table 5 shows that yields of lint cotton have varied from 126 to 223 pounds per acre since 1950. The average has been about 170 pounds per acre.

Tanganyika produces the better grades of American upland cotton with a staple length ranging from 1 to 1-3/16 inches. Varieties now planted were developed by joint research of the Empire Cotton Growing Corporation and the Tanganyika Department of Agriculture. The leading variety grown in the country is UK-51, due to be replaced by the more disease-resistant UK-55 and UK-58 which have recently been developed. In the Eastern Region, IL-58 has replaced most of the other varieties. Tested and treated seed is distributed free annually to growers by the Lint and Seed Marketing Board. This seed is produced on the Board's special cottonseed research farms. No other cottonseed can be planted in Tanganyika without the Board's permission.

Insect damage is of major importance, especially in the Eastern Region, where the American bollworm is active. Some damage from American, spiny, and pink bollworms has occurred in

Table 5.--Tanganyika: Area, yield, and production of cotton lint, 1950/54 to 1963/64

Year <u>1</u> /	Area	Average yield per acre	Production
	<u>1,000 acres</u>	<u>Pounds</u>	<u>1,000 pounds</u>
Average 1950/54...	210	126	26,455
1955/56.....	300	162	48,501
1956/57.....	300	176	52,910
1957/58.....	400	165	66,138
1958/59.....	400	171	68,343
1959/60.....	450	181	81,570
1960/61.....	450	167	74,956
1961/62.....	475	139	66,138
1962/63.....	475	176	83,775
1963/64 <u>2</u> /	475	223	105,821

1/ Crop year beginning August 1.

2/ Estimate.

Source: Cotton Progress Reports, Ministry of Agriculture, Dar es Salaam, Tanganyika.

the West Lake Region. Bacterial blight (*Zanthmonas malvacearum*) limits cotton production in the Lake Region, but the new resistant varieties will help overcome this problem.

Cotton is produced by Africans on small family farms in fields usually less than an acre. Such fields are not interplanted with other crops. The area planted is determined by what the family can cultivate and pick with hand labor. In some areas, especially in the Lake Region, oxen or contract plowing are used, but the land is usually prepared and cultivated with the hoe. Little or no chemical fertilizer or manure is applied. After the harvest, farmers are required to uproot and burn the plants to destroy pests and disease-carrying plants.

In the Lake Region and nearby areas, cotton is planted during December and January and harvested from July to September. In the Eastern Region, cotton is planted from February to April and harvested from August to December.

Producers deliver seed cotton to the many buying stations maintained by cooperative societies or private gins, which act as agents of the Marketing Board. The seed cotton is usually brought to these stations in woven sacks carried on the head (fig. 7). From the buying stations, the cotton moves by truck to the nearest gin, and then by lake, river, and rail transport to Dar es Salaam. Export bales are 400 pounds gross, rather than 500 pounds gross, the U.S. statistical standard. At Dar es Salaam, the Marketing Board sells the lint cotton at public auction. All cottonseed except that retained for seeding is auctioned at Mwanza and certain other points for local crushing or export. Only certified seed of improved cotton varieties is planted in Tanganyika, the only country south of the Sahara to control quality. Cotton is the only crop marketed in Tanganyika at Government-fixed prices. There are no export subsidies.

During December 1962, the Peoples Republic of China entered the Tanganyika cotton market for top grades of cotton. This boosted prices about 6 cents a pound.



Figure 7.--Sukuma women transporting seed cotton to buying station of cooperative near Mwanza, Lake Region.

The Marketing Board maintains cleanliness, quality in grading, and care in storage and handling. In addition to seed, it furnishes the farmers, through extension and demonstration agents, information on improved practices, application of fertilizers, and use of insecticides. The cooperative unions have recently introduced a limited number of closely woven jute bags that can be closed when filled with cotton for cleaner transport of the crop from buying stations to gins. Most of Tanganyika's cotton moves into export channels through Dar es Salaam.

Tanganyika continues to strive for increased cotton production and improved quality for export.

Coffee.--Coffee is the third most valuable agricultural export crop. In 1962, it brought in \$18.4 million, 15 percent of all agricultural exports (fig. 4). In recent years, coffee production in Tanganyika has averaged about 27,000 tons per year. Two species--Arabica and Robusta--are produced. About one-fifth of the country's total coffee production is produced by European growers. The rest is produced by African farmers, primarily around Mount Kilimanjaro (Arabica) and in the Bukoba District on the west side of Lake Victoria (Robusta). Arabica production by African farmers is expanding rapidly. Production averages 5,000 tons annually in the Rungwe area of southwestern Tanganyika. Arabica, introduced in the early 1900's by missionaries for production by the Chagga people on the slopes of Kilimanjaro and Meru, has come to supply about four-fifths of the total coffee output of Tanganyika. In 1961/62, the Northern

Region, mainly these mountain slopes, accounted for more than half of the Arabica crop. Arabica grows well only at higher elevations. Both African and European farmers have made new plantings of selected Arabica in the Southern Highlands and Southern Regions.

Robusta, the indigenous species which is now widely used for blending in instant coffee, is more rust-resistant than Arabica but sells for less. It is produced mainly in the Bukoba area of the West Lake Region, but even here it is replaced at high elevations by Arabica.

Most of Tanganyika's coffee crop is exported to the United States, West Germany, and the Netherlands. In 1962, Tanganyika shipped 10,000 tons of coffee valued at \$6 million to the United States. This represented 40 percent of Tanganyika's volume of coffee exports.

Except for coffee rust, which is indigenous to East Africa, no disease seriously restricts coffee production. Control of coffee insects is usually financed by the cooperatives and supervised by the Department of Agriculture.

Coffee plantings have increased in recent years despite the world coffee surplus. The area devoted to this crop is expected to increase in the near future (appendix tables 16 and 17). Production will continue to rise as new trees come into bearing, improved practices are adopted, and old trees are replaced.

Table 6 shows that coffee yields have varied from 207 to 255 pounds per acre since 1951. The average has been about 231 pounds.

Most of the African-grown coffee is interplanted with plantains or bananas in the Northern Region or with plantains, bananas, and beans in the Bukoba area of the West Lake Region (fig. 8). Improved methods of growing trees with mulch are limited, for the most part, to European plantations and to the newer African plantings of Arabica and Robusta in the Southern Highlands Region, and to Arabica in the West Lake Region (fig. 9).

Table 6.--Tanganyika: Area, yield, and production of coffee, 1951/55 through 1963/64

Year	Area	Average yield per acre	Production
	<u>1,000 acres</u>	<u>Pounds</u>	<u>1,000 pounds</u>
Average 1951/55...	181	207	17
1956/57.....	199	255	23
1957/58.....	198	234	21
1958/59.....	210	241	23
1959/60.....	266	215	26
1960/61.....	266	249	30
1961/62 <u>1/</u>	266	207	25
1962/63 <u>1/</u>	266	232	28
1963/64 <u>1/</u>	266	240	29

1/ Estimate.

Both mild and hard coffee are produced in Tanganyika. Mild coffee is obtained from the Arabica species. The fruit, or cherry, is put through a pulping machine to remove the outer skin and pulp. The mucilaginous material adhering to the beans is then removed by fermentation, washed, and dried in the sun. This process is also used in other coffee producing countries. Hard coffee is processed from Robusta and Arabica cherries which are sun dried. Mild coffee is produced in eastern Tanganyika, especially in the Northern Region; hard coffee is produced almost entirely in the West Lake Region.

All coffee growers and cooperatives are represented on the Tanganyika Coffee Board which consults with the Government on policy and research problems. This Board represents the growers in international matters, such as the International Coffee Agreement and the recently established Inter-African Coffee Organization. It also finances the two principal research stations at Lyamungu (near Moshi) and at Maruku (West Lake Region) and a substation in the Southern Highlands Region.



Figure 8.--Robusta coffee being harvested in West Lake Region

Tanganyika's coffee production has increased almost 50 percent during the last decade and an effort is being made to increase production by Africans. It has been estimated that the coffee crop in 1964/65 will exceed 30,000 tons--17,000 tons of mild and 13,000 tons of hard coffee.

The Tanganyika Government continues to encourage increased production of coffee and improved quality for export.

Oilseeds.--In 1962, exports of oilseeds were \$6 million, 5 percent of the total value of all agricultural exports (fig. 4). In addition to domestic production, Tanganyika imports edible oils and hydrogenated fats. Except for coconuts and cottonseed, oilseeds are not of major importance for domestic consumption.

Cottonseed, peanuts, castor, sunflower, and sesame seed are grown mainly for export. Production varies widely, partially influenced by world prices. In 1962, Tanganyika produced 145,000 tons.

Three factors have seriously affected the volume of oilseed production: (1) Pests and diseases; (2) lack of varieties suitable to the Tanganyika lowlands; and (3) periodic lack of interest by merchants and exporters.

Cottonseed is becoming increasingly important, particularly in the Lake Region, because of the expansion of cotton production. By 1960, domestic oil mills, all controlled by Indians, were absorbing substantial amounts of the cottonseed production in western Tanganyika. A large percentage of the cottonseed oil is used domestically for soap. In 1963, about 102,000 tons of



Figure 9.--Young Robusta coffee plantation under improved methods of growing trees alone with mulch. Bukoba, West Lake Region.

cottonseed in excess of planting requirements were produced (appendix tables 16 and 17). Exports of cottonseed oil average 2,000 tons annually; cottonseed cake, 19,000 tons. The United Kingdom and Kenya are major markets for these exports, with most of the cottonseed oil going to Kenya.

Production of peanuts is centered in the Western, Central, and Southern Regions. Although considered a cash crop by most producers, peanuts are used for food in fairly large quantities when prices are low or when other foods are scarce. Yields are sometimes reduced by prolonged wet weather during the ripening stage when the nuts germinate or become discolored or deformed. Unfavorable rainfall distribution, heavy textured soils, and rosette and other diseases, coupled with hasty planning, inadequate equipment, and land clearing difficulties explain the failure of the Groundnut Scheme at Nachingwea (Southern Region), Longwa (Central Region), and Urambo (Western Region, west of Tabora). Peanuts are no longer an important crop in these localities, except at Nachingwea.

The Groundnut Scheme was a 6-year plan, initiated by the United Kingdom in 1947. The objective of this Scheme was to bring about a rapid expansion of peanut production in East Africa, through mechanized land clearing and cultivation. The target, as early as 1950-51, was to have 1.6 million acres in peanuts with production over 600,000 tons.

The Groundnut Scheme was turned over to the newly established U. K. Overseas Food Corporation in 1948. The Scheme was then confined to Tanganyika, and centered in areas where sunflowers, corn, and sorghum, as well as peanuts were planted. This total cultivated area in Tanganyika, rising far more slowly than expected, amounted to only 85,000 acres by 1949/50, and little more than half of that could be harvested because of drought. Output of peanuts, which totaled about 1,600 tons in 1947/48 and 2,150 the next year, dropped to nearly 1,500 tons in 1949/50; that year the harvest also included some 1,800 tons of sunflower seed, 850 tons of corn, and 180 tons of sorghum.

Thus, the Groundnut Scheme came under severe attack for its slow and costly operation. The Scheme absorbed in the first 2 years nearly all the funds allocated for the original 6-year plan. The British Government announced in the summer of 1950 that attempts to grow large quantities of peanuts in East Africa would be given up and that the Groundnut Scheme would be turned into a plan for colonial development. The revised and smaller plan, focused on experiments with mechanized agriculture under tropical conditions, was adopted in 1951 and later was transferred to TAC. Some peanuts are still grown on TAC farms, but these contribute only a small share of the total output of peanuts.

Since 1950, however, much valuable experience has been gained under more practical operating conditions on Groundnut Scheme farms.

Castor seed is produced from semiwild or backyard plants, chiefly in the Central, Eastern, and Southern Regions. Production varies greatly from year to year. In 1962, Tanganyika exported about 13,700 tons valued at \$1.7 million. In that same year, exports of sunflower seed were about 12,000 tons, valued at approximately \$1 million.

Sesame seed has gained in popularity since the Morado variety was introduced. In 1962, Tanganyika exported about 8,300 tons valued at \$1.6 million. Sesame seed oil is used mainly by Asians as a cooking oil. Sesame seed is planted alone or is interplanted with corn. Cultivators are used to control flea beetles, the principal pest, with dusts.

Domestic demand for coconuts and copra exceeds production. Coconut palms are grown mainly on large plantations on Mafia Island (fig. 1) and on the coastal fringes of the Eastern and Tanga Regions. There were 6,000 tons of copra produced in 1962. Approximately 50,000 tons of fresh coconuts are consumed annually in Tanganyika, although some are shipped to Kenya. Coir fiber is processed from the coconut husks. The Tanganyika Government has attempted to increase coconut yields through such measures as improved pest control and bonuses for proper planting, but there has been little response.

Minor quantities of oil are obtained from palm kernels grown mainly in the Western Region, and from mafura bitterwood grown mainly in the Southern Highlands Region.

A substantial increase in output of oilseeds appears likely if: (1) Improved production and management techniques are used; (2) improved seed varieties are planted; (3) trading port facilities and roads are developed; and (4) cooperative marketing facilities are organized. At the current rate of growth, the value of total oilseed production may reach \$20 million by 1969.

Cashew Nuts.--Exports of cashew nuts have expanded sharply in recent years. They have risen from an average of 11,000 tons per year during 1951-55, to 61,000 tons in 1963. Exports

for 1962 were valued at \$6.5 million, 5 percent of the total value of all agricultural exports. Tanganyika is the world's third largest producer of cashew nuts.

Cashew nut production has been stimulated and developed by Indian traders. But African marketing cooperatives are beginning to develop, and production and quality are improving.

The cashew tree, which was introduced from the Western Hemisphere, thrives at high temperatures on well-drained slopes. Many trees are now semiwild. The Tanganyika Department of Agriculture is working on selection of varieties, spacing of trees, and timing of spray applications to control pests and induce better yields.

Domestic consumption is small. Most unshelled nuts are exported to India for shelling and grading, and are then reexported to the United States. Recently, growers have started shelling the nuts for direct export to the United States (fig. 10).

Most cashew nut production is concentrated in the Southern and Eastern Regions and in the coastal area of Tanga Region. As the cashew nut tree is drought resistant and does not require very fertile soil, large areas of Tanganyika are suitable for its cultivation. Because of the recent and continued planting of cashew nut trees, an increase in exports may be expected in the near future.

The movement toward exporting shelled rather than unshelled cashews will add substantially to the country's economy. This would result from savings on ocean transport costs to India, from added value from shelling, and also from the fact that cashew shell oil could be produced as a byproduct of considerable value.

Some research has been conducted in Tanganyika concerning development of mechanical shelling equipment. An important development in Tanganyika's cashew nut industry began on May 11, 1962--the Tanganyika Cashew Nut Company Limited of Dar es Salaam loaded 42 tons of cashew shell oil for shipment to the United States.

Tea.--Tea is a cash crop of rapidly increasing importance to Tanganyika's export trade. In 1962, Tanganyika sold 3,500 tons of tea valued at approximately \$4.1 million to its major customers--the United Kingdom and the United States. Tea is produced entirely on plantations owned by Europeans and Asians in the Usambara Mountains in the Tanga Region (fig. 11), and in the Mufindi, Tukuyu, and Njombe districts of the Southern Highlands Region. In the last few years, acreage has increased by about 1,250 acres a year (appendix table 17). There were 22,000 acres planted in tea



Figure 10.--Cracking cashew nuts by hand. African growers are beginning to crack their own cashews for direct export, mainly to the United States, rather than shipping them to India for cracking and grading. Southern Region.



Figure 11.--Tea plantation on southern slopes of Usambara Mountains. Tanga Region.

by 1963. The most rapid expansion of acreage has been in the Usambaras and future increases will probably be here, since the area contains most of the land suitable for tea production.

In the Mufindi and Tukuyu districts, only a limited area of alienated land is suitable for further tea plantings. In the Uwemba and Lupembe areas of the Njombe district, tea production is a new venture. In each of the two latter areas some 300 to 400 acres of tea have been planted, but none of this acreage is in full production. Rainfall in the Njombe area is adequate, but growth is slow because of the high altitude. The soils of the area are friable, but they are not of high fertility. Further tea planting in the area will depend upon yields and fertilizer requirements of the tea already planted.

The Tanganyika Government plans to encourage African production in areas near existing plantations and factories. In 1962, about 5,000 tons of tea were produced. Domestic consumption totaled about 800 tons in 1961. The quality of tea is improving and the highest grades sell at prices comparable with those for good Indian teas.

Plantation acreage in tea is expected to increase to about 27,500 acres by 1969; production will probably increase somewhat faster than acreage (appendix tables 16 and 17). It is estimated that the total area of alienated land suitable for tea production is 30,000 to 35,000 acres.

Tea production appears to have a bright future in Tanganyika, since the quality of tea is acceptable on the world market and there is suitable land for further expansion.

U.S. imports of tea from Tanganyika have more than doubled in the last decade.

Tobacco.--In 1963, tobacco production in Tanganyika was approximately 3,000 tons; the commercial crop was about 1,500 tons. Eighty percent of the commercial crop is flue-cured; the rest is fire-cured, except for an extremely small output of Turkish tobacco. Ninety percent of the flue-cured tobacco is grown on European (mainly Greek and Cypriot) farms in the Iringa district of the Southern Highlands Region. Some flue-cured tobacco is also produced on European and African TAC tenant farms at Urambo, the Western Region, and elsewhere. Fire-cured tobacco is produced by Africans in the Western and West Lake Regions. Backyard production of tobacco for home use is found throughout these areas. Most villages have a few stalks or a small patch growing nearby.

Most of the commercial tobacco is purchased by the East African Tobacco Company (a subsidiary of British-American Tobacco Company which operates practically all of the tobacco factories in East Africa) for the new modern cigarette factory at Dar es Salaam or for export to Uganda, Kenya, and overseas. The quality of the leaf is not high, nor is production highly efficient. Farmers recognize the need to improve yields and quality, especially the quality of export leaf.

Elworm has infested much of the Iringa area; planters will need to rotate crops and use pesticides to combat this pest. In the Western Region, early planting and destruction of residues have helped to control tobacco diseases. In the Western and West Lake Regions, local authorities have required destruction of old stocks and trash in tobacco barns to combat the tobacco beetle.

Production prospects of flue-cured tobacco in Tanganyika may be summarized as follows: (1) Ample land suitable for tobacco production is available; (2) tobacco production lends itself to partnership arrangements between African farmers and European capital, supervision, and management; and (3) tobacco is a relatively high-priced crop which pays for the cost of supervision and management know-how.

Pyrethrum.--Pyrethrum is a relatively small but increasingly significant crop in Tanganyika. Production increased steadily from 275 tons of dried flowers in 1953 to about 1,700 tons in 1962. It is produced principally in the Northern Region and around Iringa in the Southern Highlands both by Europeans and Africans, although Europeans produce the major portion (fig. 12). Yields on good land average about 800 pounds per acre, which produce an average gross return of about \$2,700 per acre. A major problem facing pyrethrum production in Tanganyika is improvement of the quality of the flowers.

Increases in pyrethrum production may be expected from expansion of the acreage under production by African farmers. Present Government policy is to encourage farmers to grow pyrethrum in suitable areas, i.e., in the Arusha, Moshi, and Mbulu areas of the Northern Region and in the Njombe and Mbeya areas of the Southern Highlands Region.

Pyrethrum is now used by industrial countries in insecticides and pesticides, and in corrugated packaging materials. There is always a possibility that pyrethrum may be displaced from some or all of its current uses by new synthetic insecticides. But such a shift is not considered imminent. It is believed that during the next few years Tanganyika could find a firm world market for at least 5,000 tons of dried flowers annually. This suggests that a large increase in production of pyrethrum in Tanganyika would be advantageous.



Figure 12.--Pyrethrum fields on slopes of Mount Meru, Arusha, Tanganyika

A new pyrethrum processing factory now operating in Arusha, Tanganyika, was financed by the Colonial Development Corporation and several entrepreneurs from the United States. The factory processes all of the Tanganyika pyrethrum crop.

Sugar.--In 1963, approximately 56,000 tons of sugar were produced in Tanganyika (appendix tables 16 and 17).

In 1960, the United Kingdom Colonial Development Corporation, the International Finance Corporation, and two Dutch companies coordinated their financial resources and formed a major sugar company--The Kilombero Sugar Company, located in the Kilombero Valley. This plantation is near an existing highway and projected railroad connections. The fields are watered by overhead irrigation (fig. 3). The Kilombero plantation's production is expected to reach 40,000 tons soon, permitting Tanganyika to become self-sufficient in sugar. Before the Kilombero plantation became operative, almost all of the Tanganyika sugar was produced at Arushi Chini, near Moshi, Northern Region.

Recently, Dutch and other foreign financial interests increased their capital investment in the Kilombero Valley Sugar Scheme to enable the sugar mill to increase its capacity to 31,000 tons of sugar annually.

Food Crops

Sorghum and millet.--Sorghum and millet are traditionally the leading grains produced and consumed by indigenous Africans, except possibly in the heavier rainfall areas of the

Northern, Tanga, and Eastern Regions. An estimated 1,050,000 tons of grain sorghum and millet were produced in 1963. Approximately 5,000 tons of sorghum and 15,000 tons of millet were sold commercially in 1963. However, production fluctuates widely from year to year, depending upon the rainfall distribution. These grains are used as a food, chiefly in porridge and soup. They are also used in making the native beer called pombe.

Two general types of millet are grown. In low rainfall areas, the more rapidly maturing and drought-resistant type, ragimillet, is interplanted with sorghum, particularly when the earlier planted crop shows signs of failure. The second type, bullrush millet, also called pearl or cattail millet, is grown on wetter soils around Lake Victoria. Bullrush millet is also of two types, one maturing in 3 to 4 months, and the other in 6 to 7 months.

Corn.--Production of corn is concentrated in the good rainfall areas of the Tanga, Northern, Western, and Southern Highlands Region (around Iringa). Nearly 520,000 tons were harvested in 1963 from approximately 1,700,000 acres; both output and yields vary widely from year to year, depending upon rainfall distribution. In 1963, around 75,000 tons were sold for cash. Corn is a secondary cash crop grown by European and African farmers. It is sold to urban consumers and to plantations for farmworkers' rations.

Most of the corn produced is white; Africans eat U.S. yellow corn only as a last resort, as was demonstrated in the 1961/62 famine-flood relief program. Imported hybrid varieties have had little success; limited varietal research indicates that selected open-pollinated local types may be more successful. Loss from stalkborers is common, although farmers are beginning to use insecticidal dusts. Termites also cause damage.

Rice.--Rice is produced on a small scale by African and Asian farmers in areas easily flooded or irrigated by simple means. Production is mainly in the Rufiji Delta and in parts of the Tanga, Western, and Southern Highlands Regions. Dryland rice is of little importance. In 1963, paddy rice production amounted to about 120,000 tons. About two-thirds of the rice crop is sold for cash, mainly in local or nearby markets. Small quantities are exported. Rice trading and milling operations are entirely in private hands.

Wheat.--Wheat is grown chiefly in the Northern Region on the northern slopes of Kilimanjaro and in areas between Lake Eyasi and Lake Manyara. Small areas are cultivated in the Southern Highlands, Eastern, and Western Regions. Production in 1963 was estimated at 14,000 tons. Most of the wheat sold is for milling by the UNGA, Ltd. (milling subsidiary of the Kenya Farmers Association) which has a relatively new mill conveniently located in the dock area in Dar es Salaam. Flour milled from the wheat is not sufficient to satisfy domestic demand, which comes largely from non-Africans. Flour is imported from Kenya and wheat is imported from overseas countries.

Wheat is grown chiefly by Europeans, largely with the aid of tractors and combines. A few African wheat farmers also own their machinery, and a few others contract for their work to be done by machinery. By substituting single cropping for the double cropping of wheat--and thereby improving soil-moisture conditions--some farmers have increased yields. Rust is a serious problem in wet years. Depredations of the Sudan bird (dioch) have been reduced by destruction of many nesting sites.

Cassava (manioc).--Cassava is the major domestic root crop in Tanganyika. In 1963, slightly over 1 million tons were produced on approximately 500,000 acres; the annual harvest

usually fluctuates by as much as 200,000 to 300,000 tons. While cassava is important chiefly as a domestic food crop for Africans, cassava flour has recently become of some importance as an agricultural export. In 1962, more than 28,000 tons of cassava were sold commercially.

In general, cassava is the largest crop grown in Tanganyika. It is a popular food crop for several reasons: ease of planting, cultivation, and harvesting; high and certain yields; vigorous growth; resistance to drought; and ease of living storage in the ground.

Indigenous to South America, the crop was introduced to Africa by Portuguese navigators around 1600. It is a semiwoody, shrubby plant, which grows from 6 to 10 feet high. Although it is a perennial, cassava is usually allowed to grow only from 12 to 18 months. The stem is rather fragile and pithy. The plant has edible leaves, but is valued chiefly for its starchy underground roots.

Cassava is propagated from woody stem cuttings, by planting pieces of stalk 4 to 12 inches long. This is similar to the planting of sugarcane. Since the cassava stalks have no value, their use as planting material does not reduce the net yield. Cassava may be planted alone or in combination with corn, rice, plantains, or other food crops; it is usually the last crop in a simple rotation before the land is returned to fallow. Cassava plantings may be made at any time; however, highest yields are obtained when planting is done at the beginning of the rainy season. Cassava roots mature in about 18 to 24 months, when they weigh about 4-1/2 to 9 pounds. After this, the roots continue to live and grow but slowly become woody and less starchy. During the dry season, cassava can be left in the ground for use when needed or as insurance against failure of other food crops. Mosaic-resistant varieties were developed at the former German station at Amani, and recently developed varieties are also resistant to brown streak.

Cassava is less important in the diet of Tanganyika than in the diets of most West African countries. It is grown primarily in coastal areas and in the Western, Central, Lake, and Southern Regions, where residual moisture is sufficient to offset failure of the dominant grain crops.

Sweet cassava is preferred, but the bitter type is grown where baboons, wild pigs, or rodents would devour the sweet roots. The roots of bitter cassava must be washed, peeled, and processed to remove the bitter, semipoisonous substance -- prussic acid -- before the roots are used for food.

Generally, most of the cassava crop is not harvested until it is needed, since it can be left in the ground as long as 12 to 18 months and the fresh roots cannot be stored for more than a few days. Fresh sweet cassava roots are cut or grated, cooked, and eaten in much the same way as sweetpotatoes. Tanganyikan women dry cut pieces in the sun. Dried cassava is processed into crude flour for local food consumption and for export. It is also made into tapioca. Processing is done by simple homemade equipment or, especially for export, by more elaborate mechanical equipment. Commercial production of flour for export is concentrated mainly in the Southern Region near shipping facilities.

Plantains and bananas.--Plantains, or cooking bananas, are of primary importance as one of the major domestic food crops in Tanganyika, particularly in the Mount Kilimanjaro, Mount Meru, and the West Lake Regions. Plantains, as well as fruit bananas, are grown in patches in other areas where there is suitable soil and adequate rainfall. Plantains are produced commercially to some extent in the Tanga Region and near Dar es Salaam. In 1963, total production of plantains and bananas reached an estimated 775,000 tons and commercial sales about 80,000 tons.

In the Northern and West Lake Regions, plantains are also used in making native beer (pombe). On the Kilimanjaro slopes, the leaves are important for coffee mulch and for house thatching. The banana weevil, which did some damage in the West Lake Region, has been brought under control, although local damage still occurs. Panama disease (banana wilt), the scourge of fruit bananas in other parts of the world, was reported in the early 1950's on the lower Kilimanjaro slopes, but it has been kept under control by the use of resistant varieties.

Sweetpotatoes.--Sweetpotatoes are a popular food crop in Tanganyika. In 1963, a crop of 250,000 tons was produced and about 25,000 tons were sold commercially. Africans eat sweetpotatoes boiled, fried, or braised. The roots are also used for making starch, syrup, and alcohol. The leaves are eaten as a green vegetable.

Other food crops.--In 1963, other food crops grown for local consumption and small commercial sales included white potatoes (4,000 tons), beans and peas (250,000 tons), citrus, and other fruits, vegetables, and wild herbs. Small quantities of these products are sold and some are exported to Kenya and Uganda.

Fruits raised in home gardens include mangoes, papayas, and at high elevations, some temperate zone fruits. Papain, the dried extract from papaya which is used chiefly as a meat tenderizer, is produced commercially in the Northern Region. It is exported mainly to the United States. Commercial production of citrus and other fruits reached about 25,000 tons in 1963.

Onions are grown chiefly in the Northern Region and in favorable areas throughout the country. Chilies (a variety of pepper) are produced mainly in the Northern Region under irrigation. Vegetables for home consumption also include cowpeas and green beans. In 1963, commercial production of miscellaneous vegetables and wild herbs was estimated at 60,000 tons.

LIVESTOCK PRODUCTION

Livestock production contributes about 17 percent of the total agricultural income of Tanganyika. In 1962, exports of livestock products, mainly meat preparations and hides and skins, accounted for about 9 percent of the value of total agricultural exports. They greatly exceeded imports of livestock products, which consist chiefly of dairy products and fresh meat.

In 1963, there were an estimated 8.1 million head of cattle, 4.0 million goats, and 2.5 million sheep in Tanganyika (table 7). The number of cattle is not far below the human population estimated at 9.8 million as of 1963.

Table 7.--Livestock population and slaughter, Tanganyika, 1962-63

Year	Cattle	Goats	Sheep	Hogs	Donkeys
<hr/>					
	<hr/>				
	Number				
Population:					
1962.....	8,098,000	4,033,000	2,544,000	16,900	64,000
1963.....	8,125,000	4,000,000	2,700,000	17,000	63,000
Slaughter 1/:					
1962.....	76,500	47,300	29,600	700	---
1963.....	75,000	42,000	3,100	700	---

1/ Based on reports of Government abattoirs.

The large numbers of livestock, especially cattle, in Tanganyika are commonly treasured for other than economic reasons. Livestock herds are built up and maintained by pastoral tribes as a sign of prestige and wealth, as well as for economic purposes. At best, however, livestock contributes much less to the money income of the country than their numbers would indicate.

The primary pastoral farmers in Tanganyika are members of the Masai tribe (fig. 13); they practice nomadic livestock raising.

Many cattle are raised by tribes in the Lake, West Lake, Northern, and Central Regions. The Masai tribe roams over large areas of open miombo grassland country that is relatively free from tsetse fly but is endangered by many other pests and wild animals. Formerly, most of the cattle were in the hands of warlike traditional cattle tribes, such as the Masai and Wataturu, but in areas free of the tsetse fly, stock keeping has spread to tribes that do not have traditional skills of handling livestock. Africans own approximately 98 to 99 percent of all domestic animals. Non-Africans own about half the small number of hogs.

Extensive nomadic or seminomadic ranching of cattle, sheep, and goats, sometimes combined with limited shifting cultivation of food crops, is the main activity over large parts of the drier areas of central and northern Tanganyika. In other areas, most of the tribes who depend primarily on crop production also keep cattle as a separate and distinct activity. Families of pastoral tribes want large herds for their own food supplies and in excess of immediate needs in order to



Figure 13.--Native cattle owned by Masai, a pastoral nomadic tribe in the Northern Region.

exchange stock for grain with cultivating communities, as insurance against drought on the assumption that the more stock an individual has the more are likely to survive, as a mark of social prestige, and because stock is required as bride price for brothers and sons.

Although tribal members are thus anxious to increase herds and to possess as many beasts as possible, they take practically no care of the limited pasturelands available, so that feed supplies are inadequate and overgrazing has become a major cause of soil erosion. The tribes have not found it expedient to control disease. As a result, calving rates and calf survival rates are low. Moreover, there is little or no culling of heifers or castration of scrub bulls. Breeding is largely uncontrolled, thus the quality of the poor stock is not being improved.

These factors, combined with the general reluctance to sell stock except in times of drought, add up to the fact that the pastoral areas contribute far less than their potential to the national income of Tanganyika. In fact, if a fair evaluation were put on deterioration and erosion of soils due to overgrazing, the contribution of animals to the economy might well be negative in many places.

Most of Tanganyika's upland area is better suited to livestock than to crop production. However, animal diseases transmitted by the tsetse fly and an apathetic attitude among the natives toward effective livestock-raising practices limit development of this industry. Tsetse-fly infestation over wide areas (fig. 2) has prevented stocking of many regions in the country. It interferes also with market movement of animals throughout infected areas.

A comprehensive livestock marketing system operates in Tanganyika. Animals are sold at auction in primary marketplaces and then moved, under veterinary supervision, to consuming centers or to stockyard areas for the canning and byproducts factories of the Tanganyika Packers, Ltd., a company in which the Tanganyika Government has a controlling interest.

Livestock research is carried out by the Tanganyika Veterinary Department at Mpwapwa. Several smaller research stations are scattered about the country.

Cattle.--The predominant breed of cattle, particularly in the central and northern parts of the country, is known as Tanganyika short-horned Zebu. These cattle lack uniformity and seldom exceed 450 to 500 pounds liveweight at maturity. But, under the prevailing primitive conditions of livestock raising, they are hardy and have demonstrated somewhat greater resistance to disease than many other breeds.

Another common breed, Ankole, ranges along the country's southwestern and northwestern borders. These are fairly large cattle; they have long horns, straight backs, and small humps. Mature males reach 800 to 900 pounds liveweight. Other breeds and types, including the improved Boran from Kenya and southern Ethiopia, and the Nandi from western Kenya, have been introduced in livestock-improvement centers of the Department of the Veterinary Services and TAC but are not widely accepted by African pastoral farmers.

For the majority of African cattle raisers, hides are the major source of cash income; most of the meat is consumed by the producers. Milk production is limited to small quantities largely for home consumption; there is no large-scale marketing of fresh milk in urban areas. Except in the cotton areas of the Lake Region, cattle are little used for draft power.

Except among the Chagga tribe in the Kilimanjaro area and in a few other areas, African-owned cattle have not been integrated into a mixed farming system. Chagga cattle are stall-fed, but most African-owned cattle are grazed and given no supplemental feed.

On two large Government-organized ranches, cattle are run and fattened in cooperation with Tanganyika Packers, Ltd. for the Dar es Salaam and Arusha fresh-meat markets and packing plants (fig. 14). One of these ranches is operated by TAC; the other is operated by the Department of Veterinary Services. The limited funds available are used primarily for upgrading Zebu breeds.

Goats and sheep.--For many livestock producers, goat and sheep skins are a fairly important source of cash income. Goats and sheep are frequently herded together in semiarid areas, and the condition of the animals is generally poor.

The indigenous goat is relatively small, short-haired, and hardy. Increased milk production is being attempted on a small scale with Kamorai and indigenous stock. A somewhat larger program is underway for increased meat production, using the South African Boer breed for crossing with the indigenous breed.

By far the most common breed of sheep is the indigenous Masai breed. The animals are similar to those in other parts of East Africa. The Department of Veterinary Services has made limited efforts to improve carcass and wool quality by breeding with Wiltshire Horn and Black-Headed Persian rams, but distribution of such stock is limited.



Figure 14.--Cattle-holding pens at modern slaughter and meat canning plant. Tanganyika Packers, Ltd.

Other livestock.--Donkeys are the principal beasts of burden in Tanganyika; in 1963, there were approximately 63,000 in the country (table 7).

Hogs are raised principally by TAC and European farmers for domestic consumption and by both Africans and non-Africans in the Arusha-Moshi area for export to a modern bacon factory in Kenya. Africans generally do not care for pork, and Muslims do not eat it at all.

Poultry production in Tanganyika has been low because there has been a traditional taboo against egg consumption; however, the Tanganyika Government is expanding its chick-raising work and is now importing day-old chicks and selling breeding stock to African farmers.

Livestock Products

Hides and skins.--Animal hides and skins are one of Tanganyika's major exports; they have traditionally been the leading export of the livestock industry. The quantity of hides and skins exported fluctuates greatly, depending upon world prices and domestic slaughter (table 7). In 1962, Tanganyika exported about \$4 million worth, representing 3 percent of the value of all agricultural exports.

Recently, the Tanganyika Government took positive measures, with considerable success, to improve the quality of hides and skins exported from Tanganyika.

Hides and skins are sold by private sale under Government inspection and grading. Despite the low standards of animal care and the prevalence of disease and parasites, the hides and skins exported are of fair quality. The Department of Veterinary Services and specialists of the East African Common Services Organization have carried on training demonstrations to improve grading, processing, and quality. Exports go mainly to the United Kingdom and other West European countries.

Meat.--Cattle provide most of the meat produced in Tanganyika. Production of meat in 1960 was estimated as follows, in thousands of tons (including meat from animals slaughtered on farms and outside Government abattoirs): Beef and veal, 140; mutton and lamb, 9; and goat meat, 19. The output of pork was insignificant, about 200 tons. Production of poultry meat is of minor importance. A large share of all livestock products is consumed by the farm families themselves or sold or bartered locally.

Between 25 and 30 percent of the cattle sold at primary markets are slaughtered in Government abattoirs (table 7). Two packing plants at Arusha and Dar es Salaam provide a cash market for low-grade animals for processing into canned meat and extracts. During 1959, in a busy season, these plants processed 85,000 head of cattle (including the cattle equivalent of some imported beef).

Dairy products and eggs.--Commercial production of dairy products and eggs is limited to the very small quantities produced mainly by European farmers near Dar es Salaam, in the Arusha-Moshi area, and in the Iringa area.

A substantial quantity of dairy products is imported. Such imports consist chiefly of canned milk from the Netherlands and the United Kingdom, and canned butter from Kenya.

Output of eggs is estimated at 3,000 tons a year. Additional supplies are imported from Europe.

Livestock Diseases

Not only does widespread tsetse-fly infestation prevent cattle raising in many areas, but periodic encroachment into free areas causes serious losses. The Department of Veterinary Services participates in a program to reclaim large areas affected by the tsetse fly (fig. 2). This program is coordinated and sponsored by the East African Common Services Organization.

Rinderpest still causes losses occasionally, although in recent years reasonably good control has been maintained by large-scale vaccination at watering places along stock routes. Wild susceptible game and migrating unprotected animals periodically reintroduce the disease. A regional program sponsored by the organization responsible for the regional tsetse fly control program is beginning operations.

FOOD CONSUMPTION

Per capita daily food intake in Tanganyika averages about 2,432 calories (table 8). The intake varies considerably in different parts of the country and among the 120 different tribes. It is above the national average in the urban areas, in the large sisal areas of the Lake Region, and in the African coffee-producing areas around Mount Kilimanjaro and Mount Meru.

The typical African diet is high in starchy foods. Less than 10 percent of the calories are from meat, milk, eggs, butter, fats, and fish combined. This imbalance may be attributed to several factors: (1) Low purchasing power, habits, and traditions of the natives; (2) a deficiency in the transportation network which restricts movement of foodstuffs from surplus to deficient areas; and (3) lack of storage facilities to carry over food supplies from abundant to lean years.

Grains make up over 50 percent of the total food consumption. Corn is the principal grain consumed in the better rainfall areas of the Eastern, Tanga, and Northern Regions (fig. 2). In the more arid areas of the country and in the Lake and West Lake Regions, sorghum and millet are the principal or only grains consumed.

Cassava, sweetpotatoes, plantains, bananas, and pulses are also important sources of carbohydrates. Consumption of sugar and of fruits and vegetables is relatively low, although substantial quantities of both wild and cultivated fruits and vegetables (including leaves of various plants) are eaten in season. Consumption of livestock products by Africans is relatively low. Meat and fat consumption is greater in the urban areas and in the pastoral farming areas than in other areas.

Plantains and bananas rather than grains are the important sources of food among the Chagga tribe in the Kilimanjaro area, in the Bukoba area of the West Lake Region, and in a few smaller areas in the country. Cassava is grown primarily as a famine food reserve, and the amount harvested varies with adequacy of other food supplies. Various types of beans, peas, cowpeas, and pulses are consumed extensively throughout the country.

Wheat is a minor food crop in Tanganyika; it is consumed mainly by Europeans, Asians, and urban dwellers, and in the sisal-producing areas of Northern and Tanga Regions.

The Masai tribe, which is made up of pastoral nomadic livestock farmers, has a diet that consists primarily of meat, milk, and grains.

Table 8.--Tanganyika: Food balance, 1959-61 average 1/

Product	Supply					Utilization		
	Production	Imports	Exports	Total	Total nonfood use	Supply for food		
						Total	Per capita	
							Per year	Per day
	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	Kilograms	Calories
Wheat.....	13	28	---	41	2	39	3.1	31
Wheat flour.....	---	7	---	7	---	7	.8	8
Corn.....	550	19	50	519	55	464	45.2	441
Sorghum and millet..	1,000	---	4	996	220	776	92.0	857
Rice, paddy.....	88	---	4	84	9	75	5.3	52
Total cereals.....	1,651	54	58	1,647	286	1,361	146.4	1,389
Cassava.....	843	---	25	818	164	654	70.8	211
Sweetpotatoes.....	249	---	---	249	38	211	22.8	61
Potatoes.....	30	---	---	30	1	29	3.1	6
Peanuts, shelled....	24	---	11	13	2	11	1.2	18
Pulses.....	201	---	16	185	20	165	17.9	169
Other vegetables....	124	4	-16	112	10	102	11.0	7
Plantains and bananas.....	1,150	---	---	1,150	115	1,035	112.0	206
Other fruits.....	240	6	---	246	24	222	24.0	27
Coconuts, fresh	50	---	---	50	5	45	4.9	22
Sugar.....	34	25	---	59	---	59	6.0	64
Meat <u>2/</u>	146	2	10	138	8	130	14.1	58
Fish.....	60	2	2	60	12	48	5.2	9
Vegetable oils <u>3/</u> ...	26	4	4	26	---	26	2.8	68
Milk <u>4/</u>	467	18	---	485	100	385	41.7	77
Eggs.....	3	1	---	4	---	4	.4	2
Fats <u>5/</u>	39	7	4	42	---	42	1.7	38
Total consumption								2,432

1/ Based on midyear 1960 population of 9,240,000. Excludes alcoholic beverages. "Nonfood use" includes amounts used for seed and waste, feed and industrial purposes; total "Utilization" reflects extraction rates for grains; wheat 74 percent, corn, sorghum and millet 90 percent. Trade for corn includes grain equivalent of meal. Extraction rate for raw sugar is 94 percent.

2/ Carcass weight. Beef, veal, mutton, lamb, and pork.

3/ Oil equivalent of edible oil-bearing seeds including copra and palm kernels.

4/ Cow, sheep and goat milk. Production excludes the amount fed to young stock. Trade and consumption includes the whole milk equivalent of imported canned, powdered, and dried milk. Little or no milk is used for making butter or cheese.

5/ Includes butter, animal fats, lard and shortening, tallow, and ghee.

Sources: U.S. Dept. Agr., Econ. Res. Serv., Indices of Agricultural Production for 28 African Countries, December 1963. East Africa High Commission, Customs and Excise Department. Annual Trade Reports of Kenya, Uganda, and Tanganyika, 1950-62. Tanganyika, Department of Agriculture Annual Report. Dar es Salaam. Various issues, 1959-63.

At its present level of food consumption, Tanganyika is self-sufficient in all important food products except wheat, sugar, dairy products, and eggs. In 1959-61, only 5 percent of the calories consumed per capita daily came from imported foods.

Imports of food products to meet basic food requirements may be needed by Tanganyika during an occasional drought or flood year, such as 1961, when famine conditions existed in various parts of the country. In that year, large shipments of corn were sent to Tanganyika from the United States under a P.L. 480 program to aid in combating famine conditions in the corn-consuming areas of the country. Even so, Tanganyika's food exports in 1961, taken as a whole, were more than twice as large as its food imports in 1960, in terms of both energy value and monetary value.

AGRICULTURAL MARKETING AND TRANSPORTATION PRACTICES

Tanganyika's commercial marketing, storage, and processing facilities for major export crops are usually adequate. However, this is not true for such major food products as grains and cassava, which are grown mainly by African subsistence farmers who sell only small quantities of these products.

In Tanganyika, marketing boards can be established under the Agricultural Products Act for any agricultural product, with the power to set standards of quality, determine price (table 9), and control the flow of commodities to be marketed. The Act also provides for aid in the establishment of cooperatives. The Cotton Lint and Seed Marketing Board controls the marketing of lint and cottonseed. The lint is sold at public auctions in Dar es Salaam. Cottonseed is sold at public auctions in Mwanza and other cities. The Board uses some of these funds to support research and development projects in cotton-growing areas. Seed cotton is the only commodity at present having guaranteed prices to producers by a Government marketing board.

The Tanganyika Coffee Board is the principal marketing organization involved in the final sale of coffee. Coffee cooperatives act as the principal agents in the collection and partial processing of the crop. There is no Government guaranteed or controlled price of coffee to producers. Marketing of tea, sisal, cashew nuts, and most other cash crops is handled through private and cooperative trade channels, except in the Southern Region. In 1963, the Southern Region Agricultural Products Marketing Boards established controls for the marketing of all cash crops in that large region, including the cashew nuts.

A substantial number of African cattle are marketed by Tanganyika Packers, Ltd., a quasi-Government owned and operated corporation. The organization processes corned beef and beef extracts for export. Large numbers of African livestock are also marketed through private packers and butchers.

Trading by producers and merchants in Local Authority Markets is in some parts of the country compulsory to enforce collection of sales taxes.

Indians, Pakistanis, and Arabs, but particularly Indians, are the major entrepreneurs in retail and wholesale trade with Africans in rural as well as urban areas. These traders have established many trading posts where goods may be exchanged for crops. In the Southern region, Indian merchants stimulated production and marketing of cashew nuts for export to India.

Cooperatives are performing an increasingly important function in the marketing and processing of agricultural products in Tanganyika, particularly of cotton and tobacco, and

Table 9.--Tanganyika agriculture: Prices per ton paid to producers for principal crops, 1959-61

Region and year	Corn	Millet (finger)	Sorghum	Rice	Mixed beans	Cassava	Sunflower seed	Groundnuts	Cashew nuts
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Eastern									
1959.....	35.83	35.83	46.85	68.89	79.92	38.58	55.12	146.06	101.96
1960.....	33.07	33.07	33.07	60.63	77.16	35.83	55.12	157.08	110.23
1961.....	46.85	<u>1/</u>	46.85	77.36	90.94	38.58	46.85	132.28	68.89
Central									
1959.....	33.07	46.85	41.34	90.94	66.14	16.53	46.85	137.79	<u>1/</u>
1960.....	27.56	55.12	27.56	60.63	66.14	22.05	44.09	148.81	<u>1/</u>
1961.....	44.09	68.89	35.83	77.16	85.43	<u>1/</u>	44.09	176.37	<u>1/</u>
Lake									
1959.....	52.36	60.63	41.34	77.16	74.41	41.34	41.34	118.50	<u>1/</u>
1960.....	38.58	46.85	46.85	57.87	60.63	27.56	38.58	126.77	46.85
1961.....	68.89	66.14	60.63	63.38	79.92	57.87	33.07	140.55	<u>1/</u>
West Lake									
1959.....	46.85	85.43	63.38	46.85	68.89	33.07	<u>1/</u>	140.55	<u>1/</u>
1960.....	35.83	96.45	71.65	<u>1/</u>	57.87	27.56	<u>1/</u>	154.32	<u>1/</u>
1961.....	46.85	82.67	60.63	<u>1/</u>	68.89	41.34	71.65	162.59	<u>1/</u>
Northern									
1959.....	38.58	55.12	49.60	99.21	71.65	30.31	63.38	154.32	<u>1/</u>
1960.....	33.07	77.16	46.85	63.38	60.63	<u>1/</u>	46.85	165.35	<u>1/</u>
1961.....	66.14	77.16	88.19	110.23	71.65	<u>1/</u>	57.87	201.17	<u>1/</u>
Southern									
1959.....	33.07	41.34	38.58	71.65	66.14	27.56	38.58	135.03	82.67
1960.....	30.31	38.58	33.07	60.63	66.14	22.05	38.58	137.79	96.45
1961.....	33.07	44.09	38.58	71.65	71.65	24.80	38.78	140.55	74.41
Highlands									
1959.....	30.31	57.87	52.36	60.63	63.38	38.58	41.34	124.01	<u>1/</u>
1960.....	33.07	63.38	46.85	57.87	60.63	30.31	35.83	135.03	<u>1/</u>
1961.....	55.12	82.67	63.38	52.36	77.16	44.09	41.34	187.39	<u>1/</u>
Tanga									
1959.....	35.83	<u>1/</u>	44.09	63.38	79.92	35.83	55.12	165.35	71.65
1960.....	38.58	<u>1/</u>	55.12	60.63	68.89	38.58	<u>1/</u>	126.77	85.43
1961.....	60.63	<u>1/</u>	35.83	121.25	107.48	30.31	55.12	148.81	74.41
Western									
1959.....	35.83	44.09	38.58	57.87	60.63	24.80	41.34	121.25	<u>1/</u>
1960.....	27.56	44.09	49.60	44.09	52.36	19.29	38.58	126.77	<u>1/</u>
1961.....	46.85	49.60	46.85	57.87	60.63	27.56	41.34	132.28	41.34
Total <u>2/</u>									
1959.....	38.58	55.12	41.34	66.14	68.89	30.31	44.09	129.52	82.67
1960.....	33.07	46.85	35.83	57.87	60.63	22.05	38.58	135.03	96.45
1961.....	52.36	57.87	44.09	71.65	71.65	33.07	44.09	143.30	71.65

1/ Not available.2/ Average price per ton, all provinces (weighted according to sales on local markets).

Source: Statistical Abstract 1962, Statistical Division, Treasury, Dar es Salaam, Tanganyika.

recently, rice, corn, pyrethrum, cattle, oilseeds, and fresh vegetables. During the 1950's, the number of cooperatives grew rapidly.

In 1961, there were 748 marketing cooperatives, including a small number of cooperatives marketing nonagricultural products--4 credit cooperatives, 3 transport cooperatives, and 10 consumer cooperatives. As of February 1962, there were 850 primary cooperatives and 32 cooperative unions in addition to the Central Cooperative Union embracing all of them.

In 1960, the cooperatives handled produce amounting to \$36.5 million, or over one-fourth of Tanganyika's agricultural exports; coffee accounted for 55 percent of this produce and seed cotton for 40 percent.

Most of the cooperatives are concerned primarily with processing and marketing; however, many have been active in disseminating information on farming techniques to aid in increasing productivity. Some of the marketing cooperatives have extended credit to their members, but the number of credit cooperatives has been small.

A Cooperative Societies' Ordinance, passed in 1932 and amended in 1960, forms the basis of cooperative development in Tanganyika. Early in 1962, a separate Ministry of Cooperative and Community Development, and a Central Cooperative Union, to which all registered cooperatives belong, were in the Government's 3-year economic development plan. Future plans include the establishment of a cooperative college.

In addition to the cooperatives, there are several privately organized producer associations, consisting largely or entirely of non-Africans. These groups are concerned with the marketing of specific products, including sisal, coffee, tea, and pyrethrum.

As organized in 1954, TAC was to perform a dual function: (1) To bring to a feasible conclusion the investigative work in established permanent systems of self-supporting agricultural production in three former groundnut areas at Kongwa, Urambo, and Nachingwea; and (2) to promote, develop, and manage planned settlement schemes and such other agricultural projects as may be considered by the Government to be in the best interest of the economic development of the country.

TAC maintains and operates large crop and livestock farming areas at Kongwa, Nachingwea, and Urambo. In addition, TAC has carried out certain projects for the Government, including the Rufiji Basin survey, the Ruvu ranching project, and experimental nonflue-cured tobacco-growing project, and various pilot farm and irrigation projects conducted on a small scale.

The International Bank for Reconstruction and Development (IBRD) has recommended that the Tanganyika Government take over the assets of TAC but that TAC continue to play an important role in Tanganyika agricultural development projects.

Transportation of African-produced farm products from farms to local markets is usually by headload (fig. 7) or, in some areas, by donkey back. From the local market to processing and marketing centers, transportation is mainly by truck and rail, although some cotton and rice from the Rufiji Delta and cotton and coffee from the Lake and West Lake Regions move partly by water transport. Some products are trucked for hundreds of miles to the nearest railhead or processing center, particularly from the Southern, Southern Highlands, and the Western Regions.

These Regions, which are served by only a few dirt roads, can market only high-value products that can bear long costly transport. Transport and interchange of commodities will be greatly facilitated on completion of the new line connecting the main Central Railway and the Tanga-Northern Line, which in turn connects with Kenya railroads.

Nearly all of the few main roads are dirt or gravel, but the East Africa Railways and Harbors Administration operates regular bus and truck transport over most of them. Private truckers also transport freight in some areas for short hauls, for example, from cotton-buying stations to gins. Cotton production has increased substantially and most of it is now sold at auctions at Dar es Salaam instead of Kampala, Uganda; cotton shipments from the Lake Region to Dar es Salaam have sometimes been seriously delayed because not enough freight cars have been available.

AGRICULTURAL POLICY AND GOALS

The long-term agricultural policy of Tanganyika is aimed at expanding the production of cash crops by African farmers, greater crop diversification, more efficient marketing facilities, and improvements in the quality of export crops and African livestock.

The Government's more immediate goals are to encourage increased agricultural productivity through better land-use practices, more intensive and better adapted crop rotations, and greater crop diversification. It has been estimated that over 4 million acres of arable land could be opened up for crop production by irrigation and flood control projects.

Coffee, cotton, and sisal policy in Tanganyika continues to be one of increasing production and improving quality for export.

Tanganyika's foreign agricultural policy is directed primarily toward maintaining its position in the world market for sisal, coffee, cotton, and cashew nuts and toward expanding a wide variety of other agricultural exports. Success in this effort is deemed by the Government to be imperative, since these exports earn a substantial amount of foreign exchange for development of the country's economy.

The Tanganyika Government is now engaged in a program of Africanization of all Government offices. Expatriates are being replaced by Africans. Land-settlement programs are being accelerated throughout the country. There is increasing indication of widening the coverage of agricultural products for both domestic and export crops under the supervision of regional or national marketing organizations, including price stabilization schemes, formerly confined mainly to cotton. An example of this is the recent organization of the Southern Region Agricultural Products Board whose operations extend to cashew nuts, corn, peanuts, etc. Since independence, a graduated export tax has been imposed on sisal; freight rates have risen, and wages for sisal workers have increased between 25 and 40 percent. The Government of Tanganyika looks toward Israel as a model in establishing new marketing boards and cooperatives in different parts of the country.

INTERNATIONAL TRADE IN AGRICULTURAL PRODUCTS

Agricultural products represent a major segment of Tanganyika's total export trade, representing 83 percent in 1959, 84 percent in 1960, 78 percent in 1961, and 81 percent in 1962

(table 10). During the past 3 years, over 30 percent of Tanganyika's exports, agricultural and nonagricultural, were shipped to the United Kingdom, Tanganyika's leading commodity buyer (fig. 15).

The United States is Tanganyika's third best customer, taking more than 9 percent of total value of exports in 1962 (fig. 15). In that year, Tanganyika sent \$6 million in coffee and \$4 million in sisal to the United States. These exports are of prime importance to Tanganyika's economy, since they bring in American dollars to the country. Other leading customers for Tanganyika's exports in 1962 were West Germany, \$12 million; Hong Kong, \$11 million; the Netherlands, \$8 million; India, \$10 million; and Japan, \$6 million (table 11).

Agricultural Exports

The major agricultural export of Tanganyika is sisal. It accounted for 29 percent of the total value of all exports in 1962; next in ranking were cotton, 14 percent, and coffee, 12 percent.

Table 10.--Tanganyika: Quantity and value of exports, selected agricultural commodities, 1961-63

Commodity	1961		1962		1963 ^{2/}	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 metric tons	1,000 dollars	1,000 metric tons	1,000 dollars	1,000 metric tons	1,000 dollars
Sisal	204.1	39,279	223.0	44,056	228.0	51,000
Cotton	30.1	19,024	33.1	20,699	42.0	25,000
Coffee	25.0	18,935	26.1	18,411	27.0	19,500
Oilseeds, oil nuts, and oil kernels.....	49.7	6,471	47.1	6,004	^{1/}	^{1/}
Cashew nuts	40.6	5,054	60.0	6,539	55.0	6,400
Hides and skins.....	7.6	4,606	6.9	3,984	^{1/}	^{1/}
Meat and meat preparations.....	6.2	5,891	7.4	6,646	4.6	4,300
Tea.....	3.2	3,743	4.1	4,566	4.0	4,400
Beans and peas	11.7	1,738	18.7	2,977	21.0	4,200
Feedstuff for animals	34.0	1,952	37.5	2,436	^{1/}	^{1/}
Corn	^{1/}	^{1/}	19.5	911	^{1/}	^{1/}
Other agricultural ...	---	8,650	---	4,346	---	^{1/}
Total agricultural.....	---	115,343	---	121,593	---	150,000
Nonagricultural.....	---	33,381	---	28,575	---	20,000
Total exports.....	---	148,724	---	150,168	---	170,000
	<u>Percent</u>		<u>Percent</u>		<u>Percent</u>	
Agricultural exports: as percentage of total exports.....	77.6		81.0		88.2	

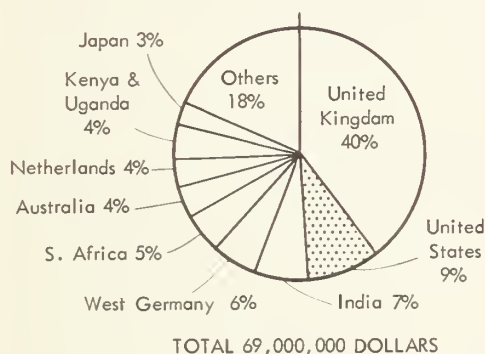
^{1/} Not available.

^{2/} Estimate.

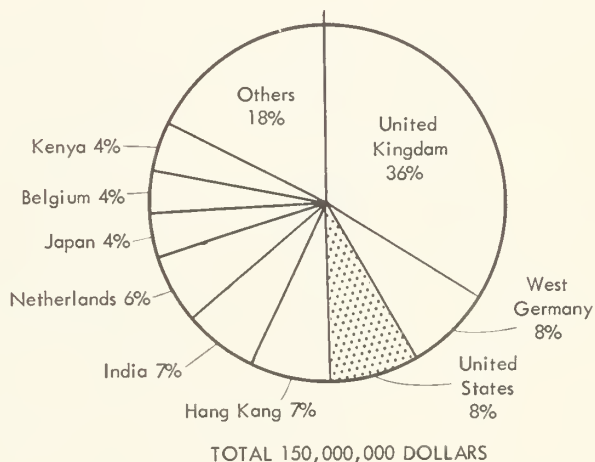
TANGANYIKA: DISTRIBUTION OF TOTAL TRADE, 1950 AND 1962

EXPORTS

1950

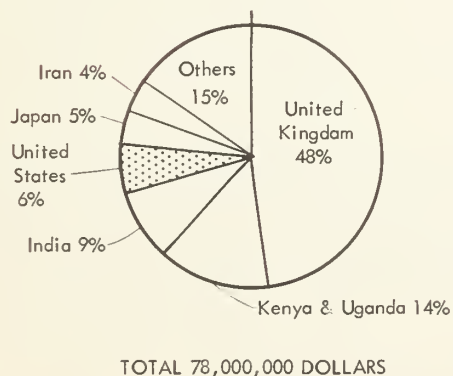


1962



IMPORTS

1950



1962

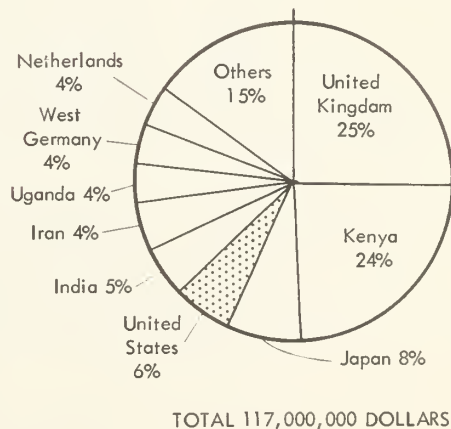


Table 11.--Tanganyika: Value of exports, by destination, 1961-63

Country	Value		
	1961	1962	1963 ^{1/}
	- Million dollars -		
United States	13.4	12.0	13.6
United Kingdom	48.7	51.5	58.3
West Germany	11.0	12.1	13.8
India	7.1	10.1	11.4
Netherlands	8.3	8.3	9.5
Japan	6.2	5.7	6.5
Hong Kong	9.1	10.5	11.9
Belgium	4.4	5.5	6.1
Kenya and Uganda	6.3	5.5	6.1
Australia	3.0	3.3	3.7
Italy	3.5	3.3	3.7
France	2.4	2.0	2.4
Denmark	2.2	2.0	2.2
Republic of South Africa	2.0	2.3	2.7
Canada and Newfoundland	2.1	2.9	3.2
Other countries	19.0	13.2	14.9
Total exports	148.7	150.2	170.0

^{1/} Estimate.

Together with oilseeds and other oil-bearing materials and cashew nuts, these products furnished about 63 percent of all foreign exchange earnings from agriculture. The remaining exports consisted mainly of meat, mostly canned corned beef (4 percent), hides and skins (3 percent), and tea (3 percent).

Agricultural Imports

Approximately 20 percent of Tanganyika's imports in 1962 were agricultural products (table 12). Tanganyika has little industry, hence its imports consist mainly of manufactured products. Wheat and other grains, including flour, accounted for 6 percent of the total value of agricultural imports in 1962; refined sugar, 9 percent; dairy products and eggs, 12 percent; and beer, about 8 percent. Other imports included vegetable oils and fats, spices, canned fruits and vegetables, and vegetable preparations.

The United Kingdom supplied 25 percent of Tanganyika's agricultural and nonagricultural imports in 1962 (table 13). Kenya and Uganda were the second most important suppliers of agricultural products, furnishing cereals, beer, tea, vegetable oils, and meat and meat preparations. Substantial quantities of dairy products and hydrogenated fats and oils came from the Netherlands. Formosa was the leading source of Tanganyika's sugar imports (fig. 15).

Agricultural Trade with the United States

The United States is Tanganyika's third best customer for farm exports. In 1962 the United States took \$12 million of Tanganyika's total exports of \$150 million (table 14). Tanganyika ships

Table 12.--Tanganyika: Quantity and value of imports, selected agricultural commodities, 1961-63

Commodity	1961		1962		1963 ^{1/}	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 metric tons	1,000 dollars	1,000 metric tons	1,000 dollars	1,000 metric tons	1,000 dollars
Corn, unmilled.....	56.3	3,390	60.6	3,643	---	---
Sugar, beet and cane, refined.....	24.0	2,330	24.7	2,053	23.4	1,944
Dairy products and eggs.....	9.0	2,353	7.5	2,691	6.9	2,484
Wheat and spelt.....	---	---	16.0	1,316	14.4	1,188
Vegetable oils and fats.....	3.2	1,130	2.0	704	1.8	648
Beer (1,000 Imperial gallons).....	1,762.0	1,837	1,854.0	1,904	1,901.0	1,728
Tea, coffee, and spices.....	13.8	1,395	1.2	1,560	1.1	1,404
Fruits, vegetables, and preparations..	11.1	938	10.0	973	8.9	864
Other agricultural...	---	11,125	---	11,279	---	10,476
Total agricultural	---	21,108	---	22,480	---	20,736
Nonagricultural.....	---	97,201	---	94,516	---	87,264
Total imports...	---	118,309	---	116,996	---	108,000

^{1/} Estimate.

Table 13.--Tanganyika: Value of imports, by origin, 1961-63

Country	Value		
	1961	1962	1963 ^{1/}
	Million dollars		
United States.....	4.8	6.4	5.9
United Kingdom.....	33.3	29.1	26.9
Kenya and Uganda.....	29.7	32.7	30.2
Japan.....	8.9	9.1	8.4
West Germany.....	4.2	4.4	4.0
Iran.....	4.1	5.3	5.0
India.....	6.0	6.3	5.8
Netherlands.....	6.2	4.3	4.0
France.....	1.9	2.1	1.9
South Africa.....	1.8	1.2	1.1
Formosa.....	1.6	---	---
Belgium.....	1.2	0.9	0.9
Italy.....	1.0	1.4	1.3
Bahrein Islands.....	1.1	---	---
Hong Kong.....	---	1.0	0.9
Other countries.....	12.5	12.8	11.7
Total imports.....	118.3	117.0	108.0

^{1/} Estimate.

nearly one-half of its coffee exports to the United States; U.S. shipments were valued at \$6 million in 1962 (table 14). In addition, Tanganyika ships moderate quantities of sisal fiber, tea, and cashew nuts to the United States.

Tanganyika's imports from the United States climbed from \$4.8 million in 1961 to \$6.4 million in 1962 (table 15). Agricultural imports from the United States probably could be increased substantially in the near future; Tanganyika has substantial need for such products as wheat, dried milk, and canned fruits and vegetables. With the completion of the new flour mill at Dar es Salaam, it is expected that U.S. wheat growers will examine Tanganyika closely as a potential market for wheat.

In 1962, imports from the United States represented only \$6.4 million. Principal suppliers were the United Kingdom, \$29.1 million; Kenya and Uganda, \$32.7 million; Japan, \$9.1 million; the Netherlands, \$4.3 million; and India, \$6.3 million (fig. 15).

Tanganyika has relaxed some import licensing restrictions. Production of cotton, coffee, tea, and other cash crops is increasing. The wage-earning population is gradually growing. Thus, with trade somewhat easier and income some higher, markets for some U.S. farm products should grow appreciably in the next decade.

Agricultural Trade Policy

Tanganyika, the first of the three British East African countries to become independent, is a member of the East African Common Market (which provides a de facto customs union), East African Common Services Organization, East African Currency Board, and the Sterling area.

Import tariffs are imposed by the Government at the same rate as those imposed by other members of the East African Common Market and are used primarily as a source of Government revenue. Import licenses are used to limit or prohibit importation of agricultural products that are produced in adequate supply within the country. Open general licenses cover most commodities. Special import licenses are required for corn, rice, wheat, flour, and sugar from countries other than Kenya and Uganda. Except for these, the importation of agricultural products is generally unrestricted. Wheat is imported from the United States duty free, although under the East African Common Market a 25 percent ad valorem tax may be charged. Import taxes of \$2.24 per hundredweight or 25 percent ad valorem, whichever is larger, are levied on dry milk, and 25 percent ad valorem on edible oils.

Licenses are required for the export of corn, wheat and flour, sugar, vegetable oils, jute, copra, and meat. When local shortages occur, the export of these products may be restricted. Other agricultural products may be exported without licenses. No preferential tariffs exist in East Africa under the Congo Basin Convention; however, there are high protective duties on selected commodities.

Tanganyika's Government sees a great need for increased export earnings and foreign capital and intends to create a favorable environment for foreign credit and investment.

Tanganyika's foreign agricultural policy is directed to maintaining its position in the world market for sisal, coffee, cotton, and cashew nuts and to expanding these and its wide variety of other agricultural exports, particularly tea and pyrethrum.

Table 14.--Tanganyika: Agricultural exports to the United States by quantity and value, 1961-63

Commodity	1961		1962		1963 ^{1/}	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 metric tons	1,000 dollars	1,000 metric tons	1,000 dollars	1,000 metric tons	1,000 dollars
Coffee	12.2	8,924	10.1	6,172	11.7	7,093
Sisal	17.8	3,116	20.7	3,637	23.9	4,181
Hides and skins	---	213	---	---	---	---
Tea3	296	.4	442	.5	511
Papain	---	---	---	---	---	---
Wattle bark ext.	1.4	212	.6	75	.7	83
Other agricultural ...	---	346	---	1,120	---	1,283
Total agricultural.	---	13,107	---	11,446	---	13,151
Nonagricultural.....	---	307	---	563	---	649
Total exports....	---	13,414	---	12,009	---	13,800

^{1/} Estimate.

Table 15.--Tanganyika: Agricultural imports from the United States by value, 1961-63

Commodity	Value		
	1961	1962	1963 ^{1/}
	1,000 dollars		
Cereals and cereal preparations	1,590	3,169	2,934
Fruits, vegetables and preparations....	18	---	---
Dairy products.....	281	436	404
Meat and meat preparations	1	---	---
Other agricultural.....	328	1,071	986
Total agricultural.....	2,218	4,676	4,324
Nonagricultural.....	2,612	1,743	1,616
Total imports	4,830	6,419	5,940

^{1/} Estimate.

AGRICULTURAL DEVELOPMENT

Agricultural development in Tanganyika is aimed at increasing the supply of capital goods which will complement the efforts of the large unused labor force. The primary target of agricultural development is to expand agricultural production at a rate in excess of population growth. The Tanganyikan Government is hopeful that a revitalized agricultural program will be able to absorb much of the country's untapped human resource of unemployed and underemployed workers. During the past few years, Tanganyika has been fortunate in maintaining a satisfactory

ratio of production to population growth. Estimated annual African production of food crops has increased at a rate of 2.5 percent a year, slightly faster than the population increase, estimated to be about 1.7 percent annually. This indicates a real gain in per capita income and progress in achieving self-sufficiency in foodstuffs. Increased agricultural production allows the farmer to grow other crops that may add a desirable variety to the diet and to substitute domestically grown crops for some imported food, and to produce more cash crops for export.

The Government of Tanganyika instituted a 3-year development plan in 1961, covering the fiscal years 1962, 1963, and 1964. The plan called for Government development expenditures of about \$67 million over the 3 years. Financing was to come in part from external sources. The plan emphasized raising agricultural production, crop diversification, improving standards of farming and marketing, improving the transportation system, expanding and improving secondary and technical education, and land settlement and self-help projects. The plan was not a comprehensive program for all sectors of the economy, but a projection of the Government's capital expenditures over the 3-year period, taking into consideration likely developments in the private sector. The development plan for the public sector will be carried out by the Government.

By mid-1963, Tanganyika had received total loan commitments of \$53.7 million toward financing the 3-year development plan: From the United Kingdom, \$35 million in loans and grants; from the United States, \$10 million in loans; and from West Germany, \$8.7 million in loans. A limited assistance type loan of \$10 million was received in March 1963 from Yugoslavia. Also in 1963, Israel committed a \$1 million loan for agreed projects of technical assistance.

An agreement was signed in Dar es Salaam on January 11, 1964, governing the use of \$3.5 million of a previously negotiated \$5.7 million loan by the British Government to Tanganyika. The funds will be used for the provision of permanent road bridges, pilot village settlements, import financing for Government projects, and a new dam at Nyumba ya Mungu.

In 1960, the Food and Agriculture Organization, the Tanganyika Government, and the United Kingdom completed a joint irrigation, power, flood control, and agricultural survey of the watersheds of three rivers flowing into the Indian Ocean--the Pangani, Kigoni, and Rufiji--encompassing an area of more than 20 percent of the country.

The IBRD Mission to Tanganyika in 1959 suggested that development plans should aim at the following objectives:

- (1) Development of agricultural and livestock industry;
- (2) Development of water supplies and irrigation;
- (3) Improvement and development of communications; and
- (4) Development of secondary and technical education.

In accordance with these objectives, the mission proposed the allocation of 29 percent of expenditures to communications, power, and utilities; 24 percent to agriculture; and 14 percent to education. Smaller proportions were to be allocated to projects concerning land use surveys, local Government problems, commerce and industry, labor problems, and health services.

The Tanganyika Government is engaged in a program of Africanization of all Government officers. Land settlement and agricultural programs and policies are being accelerated throughout the country. Private foreign capital has played an important role in the country's agricultural development in the past and is expected to play a greater role in the future. It is expected that Tanganyika will devote increased attention to obtaining financial assistance from outside sources to maintain a satisfactory rate of economic growth. Economic development and Government policy in Tanganyika are inseparable.

OUTLOOK

The long-term outlook for increased production of specialized agricultural products in Tanganyika is favorable. Present agricultural methods, for the most part primitive, are subject to substantial improvement. Large additional areas could be cultivated or grazed if the tsetse fly were eliminated, adequate range management employed, land and water use practices improved, and irrigation facilities developed. It is estimated that over 4 million acres could be opened up for crop production by irrigation and flood control.

Considerable progress has been made in the past 10 years in the development of Tanganyika's agriculture, even though overall economic growth has not been spectacular. It is anticipated that the growth rate will accelerate in the next 10 years. From 1948 to 1958, the economy of the country grew at an annual rate of approximately 5 percent. It is anticipated that the growth rate will accelerate to 6-1/2 percent during the next 7 years.

Projections for agricultural export earnings, based on 1960 prices, are predicated at a 6-1/2 percent per annum increase from 1964 through 1970, as shown in the following tabulation:

1964	\$174,000
1965	185,000
1966	197,000
1967	210,000
1968	223,000
1969	238,000
1970	253,000

Tanganyika's agricultural exports have been increasing at an average annual rate of 6 percent.

It is projected that the volume of Tanganyika's agricultural exports will increase 37 percent by 1965 and about 88 percent by 1970 from the 1960 level. The following tabulation shows projections as a percentage of agricultural export volume in 1960:

1964	128.7
1965	137.1
1966	146.0
1967	155.5
1968	165.6
1969	176.4
1970	187.9

These projections assume an average annual rate of increase of 6-1/2 percent in the next 7 years. They are based on the performance of Tanganyika's economy during the past 6 years and recent public policies and economic development expenditure programs.

It appears certain that Tanganyika will continue to raise the same cash crops that are presently grown, with substantial increases in production likely for coffee, tea, sisal, and cashew nuts--the principal export crops.

Tanganyika will continue to import cereals and cereal preparations, vegetable oils, dairy products, canned fruits, and vegetables. Future agricultural imports from the United States might include expanded amounts of these products, particularly imports of wheat and dry milk. In turn, Tanganyika will continue to sell large quantities of coffee, sisal, tea, and wattle bark extract to the United States. If, in the near future, effective large-scale equipment to grade and shell cashew nuts is developed, a substantial increase in the export of cashew nuts and kernels to the United States may result.

Tanganyika's agricultural imports were only 17.8 and 19.2 percent of total imports in 1961 and 1962, respectively. The United Kingdom and Kenya, as the principal suppliers, provided almost 50 percent of Tanganyika's imports in 1962; the European Common Market countries, 11 percent; Japan, 8 percent; United States, 6 percent; and India, 5 percent.

Tanganyika had an estimated per capita gross domestic product of \$63 in 1962 and an average annual import trade of \$115 million. However, with significant foreign assistance in grants and loans, increased foreign capital investments, and steady economic growth within the country, foreign traders should find prospects favorable for an expansion of both agricultural and nonagricultural exports to Tanganyika.

The tabulations above represent economic targets at best. In most of Africa, including Tanganyika, there have recently been rather abrupt changes. With independence there are many responsibilities that can make a big difference in the country's economic development. With independence and major changes in the economy, exports can zoom or can decline, depending on Government programs and policies.

Rainfall deficiencies, unfertile soils, limited communication systems, and the presence of the tsetse fly also present problems in efforts to increase agricultural productivity.

Tanganyika will continue to import nonagricultural products for which there is a favorable market for expanded U.S. exports. Tanganyika's Three-Year Development Plan, instituted in 1961, calls for Government expenditures of about \$67 million over a 3-year period. Financing will come largely from external sources. The plan emphasizes development of agriculture and livestock, improvement of the road system, expansion and improvement of secondary and technical education, and land settlement and self-help projects.

On May 12, 1964, President Julius Nyerere announced a 5-year development plan for Tanganyika, calling for an expenditure of \$688.8 million. This plan is the first of three, which cover the period from 1965 to 1980.

The main objectives of the development plan are: (1) To raise the annual per capita income from about \$54 to \$126; (2) to make the country self-sufficient in trained manpower; and (3) to raise life expectancy to 50 years from the present level of 35 to 40.

President Nyerere stated that a plan for Zanzibar's development would be announced soon. Zanzibar and Tanganyika merged into the United Republic of Tanganyika and Zanzibar on April 26, 1964.

The 5-year development plan calls for the Tanganyikan Government to spend about \$140 million a year from 1965 to 1970. Of the total expenditure, \$324.8 million must be obtained from private overseas investment if the plan is to succeed.

To get this development plan started, the Tanganyikan Government will have to recruit 500 trained technicians with high-level skills from abroad. In addition, Tanganyika needs 1,200 teachers to fulfill educational objectives of the plan.

It is anticipated that Tanganyika will devote considerable attention to obtaining necessary financial assistance from overseas sources in order to bring about economic transformation and an accelerated rate of growth. In summary, the outlook appears favorable for a moderate expansion in agricultural production provided the political and economic climate remains favorable for development.

Appendix table 16.--Tanganyika: Production of selected agricultural commodities, 1948/49-1963/64

Commodity	1948/49	1949/50	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56
<u>1,000 metric tons</u>								
Wheat.....	4	8	6	6	12	14	10	4
Corn.....	279	351	450	375	450	375	305	523
Sorghum and millet.....	894	559	516	600	914	879	950	950
Rice, paddy.....	54	34	76	78	68	47	66	86
Potatoes.....	2	2	2	2	2	3	3	7
Sugar, raw.....	8	9	9	9	12	12	16	21
Peanuts, un- shelled.....	17	9	12	12	29	26	25	25
Cottonseed.....	19	18	19	18	30	19	39	46
Sunflower seed..	5	5	7	12	6	6	6	12
Sesame seed.....	7	5	5	5	6	8	11	13
Copra.....	16	17	27	10	12	13	13	11
Soybeans.....	1	1	1	1	2	1	1	1
Cotton lint.....	9	9	9	8	14	9	19	22
Sisal.....	123	128	124	148	165	172	181	179
Tobacco.....	2	2	3	2	2	2	3	2
Coffee.....	17	13	18	17	17	15	20	19
Tea.....	1	1	1	1	1	1	2	2

Commodity	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64
<u>1,000 metric tons</u>								
Wheat.....	4	6	16	16	12	12	14	14
Corn.....	475	500	500	635	559	457	508	520
Sorghum and millet.....	900	900	1,006	995	914	975	1,000	1,050
Rice, paddy.....	71	69	91	82	95	80	100	120
Potatoes.....	4	4	4	3	3	4	4	4
Sugar, raw.....	31	46	28	29	30	33	43	56
Peanuts, un- shelled.....	30	35	34	34	36	25	25	25
Cottonseed.....	52	64	66	78	73	64	81	102
Sunflower seed..	8	15	9	5	12	11	8	8
Sesame seed.....	16	12	8	10	10	12	9	8
Copra.....	11	14	11	12	10	9	6	9
Soybeans.....	1	2	1	1	3	3	2	2
Cotton lint.....	24	30	31	37	34	30	38	48
Sisal.....	189	188	209	208	201	220	224	224
Tobacco.....	2	2	3	3	3	3	2	3
Coffee.....	23	21	23	26	30	25	28	29
Tea.....	3	3	3	4	5	4	5	5

Appendix table 17.--Tanganyika: Acreage of selected crops, 1948/49-63/64

Year	Wheat	Corn	Rice, rough	Peanuts unshelled	Cottonseed	Sesame seed	Cotton lint	Sisal	Tobacco	Coffee	Tea
1948/49...	--	550	125	200	138	49	175	1/	12	1/	9
1949/50...	25	660	110	200	185	49	175	1/	15	140	9
1950/51...	25	775	110	119	190	49	200	1/	15	173	10
1951/52...	30	675	130	206	1/	1/	200	297	16	162	10
1952/53...	50	795	140	210	208	72	207	277	14	160	11
1953/54...	40	675	140	210	153	49	190	368	14	190	11
1954/55...	50	650	167	196	250	54	250	381	7	197	12
1955/56...	45	1,025	170	210	269	59	300	385	7	194	12
1956/57...	38	1,000	150	240	299	64	300	395	8	199	14
1957/58...	30	1,035	173	150	400	67	300	393	8	198	15
1958/59...	60	1,030	165	150	400	69	400	415	11	210	17
1959/60...	60	1,030	170	150	450	74	400	445	13	266	18
1960/61...	55	1,000	172	150	474	1/	450	445	13	266	19
1961/62...	50	1,000	175	150	1/	1/	450	2/ 445	14	2/ 266	19
1962/63...	55	1,000	185	150	1/	1/	475	2/ 445	14	2/ 266	20
1963/64...	50	1,000	185	150	1/	1/	475	2/ 445	2/ 14	2/ 266	21

1/ Not available.

2/ Estimate.

SELECTED REFERENCES

British Information Services.

1961. Tanganyika: The Making of a Nation. I. D. 1386. New York.

East African High Commission, Customs and Excise Department

1962. Agricultural Census. Dar es Salaam.

1950-62. Annual Trade Reports of Kenya, Uganda, and Tanganyika. Dar es Salaam.

Fitzgerald, Walter

1950. Africa. London, Methuen & Co.

1940. Africa: A Social, Economic and Political Geography of Its Major Regions.
London, Methuen & Co.

Hill, J. F. R., and Moffett, J. F.

1955. Tanganyika, A Review of Its Resources and Their Development.
Dar es Salaam.

Hollingsworth, L. W.

1951. A Short History of the East Coast of Africa. London, MacMillan & Co., Ltd.

International Bank for Reconstruction and Development

1961. The Economic Development of Tanganyika. Baltimore, Johns Hopkins Press.

Kimble, G. H. T.

1960. Tropical Africa. New York, Twentieth Century Fund.

Malcolm, D.

1953. Sukumaland, An African People and Their Country. London, Oxford
University Press.

Masefield, G. B.

1949. A Handbook of Tropical Agriculture. Oxford, Clarendon Press.

Moffett, J. P. (ed.)

1959. Handbook of Tanganyika. 2d ed. Dar es Salaam, Government Printer.

Murdock, G. P.

1959. Africa, Its Peoples and Their Cultural History. New York, McGraw-Hill.

Peacock, A. T., and Dosser, G. M.

1958. The National Income of Tanganyika. Colonial Research Studies No. 26.
London, H. M. Stationary Office.

Tanganyika Agricultural Corporation

Report and Accounts. Dar es Salaam, Government Printer. Various issues.

Tanganyika, Department of Agriculture.

Monthly Crop Estimate. Dar es Salaam. Various issues.

Tanganyika, Department of Lands and Surveys

1962. Atlas of Tanganyika. Dar es Salaam.

- Continued -

SELECTED REFERENCES - CONTINUED

- Tanganyika, Lint and Seed Marketing Board
Report and Accounts for the Year Ended 30th June. Dar es Salaam.
Annual Reports 1948-62.
- Tanganyika, Treasury, Economics and Statistics Division.
Statistical Abstract. Dar es Salaam, 1960, 1961. 1960 volume issued by East
African High Commission, Tanganyika Unit.
- Trewartha, G. T.
1961. The Earth's Problem Climates. Madison, University of Wisconsin Press.
- U. S. Department of Agriculture
January 1963. Indices of Agricultural Production in 28 African Countries.
Econ. Res. Serv.
-
- March 1964. The 1964 Africa and West Asia Agricultural Situation. ERS-Foreign 75.
-
- Revised March 1964. Agricultural Policies of Foreign Governments Including
Trade Policies Affecting Agriculture. Agr. Handb. 132.
-
- Revised January 1962. The World Food Budget 1962 and 1966 - and Supplement
I Africa. For. Agr. Econ. Rpt. 2, October 1961.

